OCT 1 2 1934

FOOD INDUSTRIES

THE NEWS OF • PRODUCTION • ENGINEERING • DISTRIBUTION

BAKERY PRODUCTS

BEVERAGES

CANNED AND PRESERVED FOODS

CONFECTIONERY AND CHOCOLATE

DAIRY PRODUCTS AND ICE CREAM

FATS AND OILS

FLOUR AND CEREAL PRODUCTS

MEATS AND MEAT PRODUCTS

OTHER FOODS AND SPECIALTIES

URGENT NEED

Further economic recovery is possible when confidence is restored. Business cannot thrive on uncertainty.

A sound basis is urgently needed for a reasonable faith that the economic and social order will not be suddenly upset. Sound and settled national policies are necessary.

The surest way to restore that faith is for the Administration to define its objectives and declare its policies—

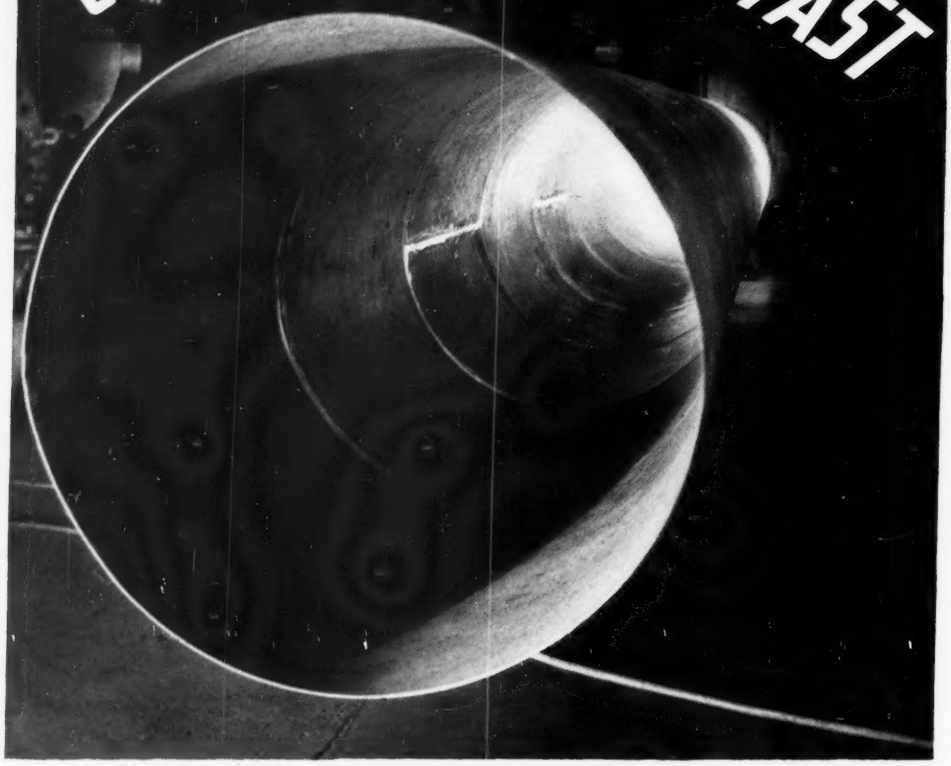
and stick to them!

OCTOBER 1934

McGRAW-HILL PUBLISHING COMPANY, INC.

315,000 POUNDS OF PLYKROME

to keep air moving—FAST



● A section of the five-foot air duct for the Milwaukee Sewage Disposal Plant . . . five feet in diameter . . . with a total length of 1800 feet. One-quarter inch Plykrome is the material.

ONE of Plykrome's advantages is the smoothness of its stainless surface . . . a coefficient of friction so low as to present little resistance to the passage of air, gases or liquids under pressure. Another advantage is the resistance of its stainless steel surface to corrosion over long periods of time. A third is the facility with which it fabricates.

This combination of qualities led to the adoption of Plykrome for a giant air duct in Milwaukee's Sewage Disposal Plant. 315,000 pounds of one-quarter inch Plykrome is being fabricated into an 1800-foot pipe line ranging up to five feet in diameter.

The entire installation is being fabricated by arc welding . . . speedily and economically. Once installed its resistance to corrosive action will assure efficiency without maintenance or replacement.

For any installation in which corrosion resistance on one side is enough and where cost saving is a factor, it will pay you to investigate Plykrome. Full information will be sent on request.

USS PLYKROME

U S S CHROMIUM-NICKEL ALLOY STEELS ARE PRODUCED UNDER LICENSES OF THE CHEMICAL FOUNDATION, INC., NEW YORK, AND FRIED. KRUPP A. G. OF GERMANY

Illinois Steel Company

208 SOUTH LA SALLE STREET • CHICAGO, ILLINOIS

SUBSIDIARY OF UNITED STATES STEEL CORPORATION

THIS MONTH
articles about

BAKERY PRODUCTS
Pages 446, 452, 457, 462
BEVERAGES
Pages 441, 460
CANNED AND PRESERVED FOODS
Pages 444, 460
CONFECTIONERY AND CHOCOLATE
Page 446
DAIRY PRODUCTS
Pages 438, 446, 462, 467
FATS AND OILS
Pages 444, 446
FLOUR AND CEREAL PRODUCTS
Page 441
MEAT AND MEAT PRODUCTS
Page 455
OTHER FOODS AND SPECIALTIES
Pages 444, 446, 457
GENERAL
Pages 442, 449, 450, 460, 462

Accident Preventing
Pages 441, 449
Byproduct Recovery
Page 444
Corrosion
Page 438
Distributing
Pages 450, 455, 462
Fumigating
Page 460
Grading
Page 446
Heat Applying
Page 452
Housekeeping
Pages 441, 449, 460, 467
Maintenance and Repairing
Pages 438, 449, 467
Managing and Planning
Pages 442, 450, 452, 455, 457, 462
Packaging
Page 457
Pest Controlling
Pages 457, 460
Processing
Page 444
Quality Controlling
Pages 446, 455
Raw-Material Selecting
Page 446
Refrigerating
Page 455
Sanitation
Pages 449, 460
Spoilage Preventing
Pages 438, 444, 446, 455
Trucking
Pages 450, 455, 462
Wrapping
Page 457

FOOD INDUSTRIES

NEWS OF PRODUCTION • ENGINEERING • DISTRIBUTION

LAURENCE V. BURTON, *Editor*
LOUIS F. STOLL, *Vice-President*
M. A. WILLIAMSON, *Manager*

Editorial Staff:
E. S. STATELER, *Associate Editor*
G. L. MONTGOMERY, *Managing Editor*
F. K. LAWLER, *Assistant Editor*
R. S. McBRIDE, *Washington*
PAUL WOOTON, *Washington*
LEONARD CHURCH, *Cleveland*
N. A. BOWERS, *San Francisco*
S. T. HENRY, *Spruce Pine, N. C.*

Contents for October 1934

VOLUME 6 NUMBER 10

$6,000 Worth of Good Milk Given Bad Taste 438
BY R. L. PERRY

Malt Dust Is Dangerous 441

Ways to Set Up Industrial Pensions 442
BY G. CHAUNCEY PARSONS

Raisin Oil, a Byproduct of Unusual Value 444
BY ALBERT M. PAUL

Butter as an Ingredient of Commercial Foods 446
BY F. W. BOUSKA

Are Your Floors Well Lubricated? 449
BY OSCAR J. SCHNITZ

Easy Way to Determine the Center of Distribution 450
BY K. B. KEEFER

How Vapor-Sealed Bake Oven Cuts One-Third Off Fuel Bill 452
BY G. R. FENNEMA

Booster Refrigeration Put on Trial by Packers 455
BY HALDANE GEE

Using Foil to Protect Packaged Food From Storage Pests 457

Flies! Gnats!! Ants!!! 460
BY HARRY STINER

Automotive Forum 462

New Equipment to Be Seen at Dairy Industries Exposition 464

Editorials 435
What's on Your Mind? 466
Ideas From Practical Men 467
News 468
Men, Jobs and Companies 474
Business Trends 476
New Products 478
New Equipment 480

Manufacturers' Catalogs ... 481

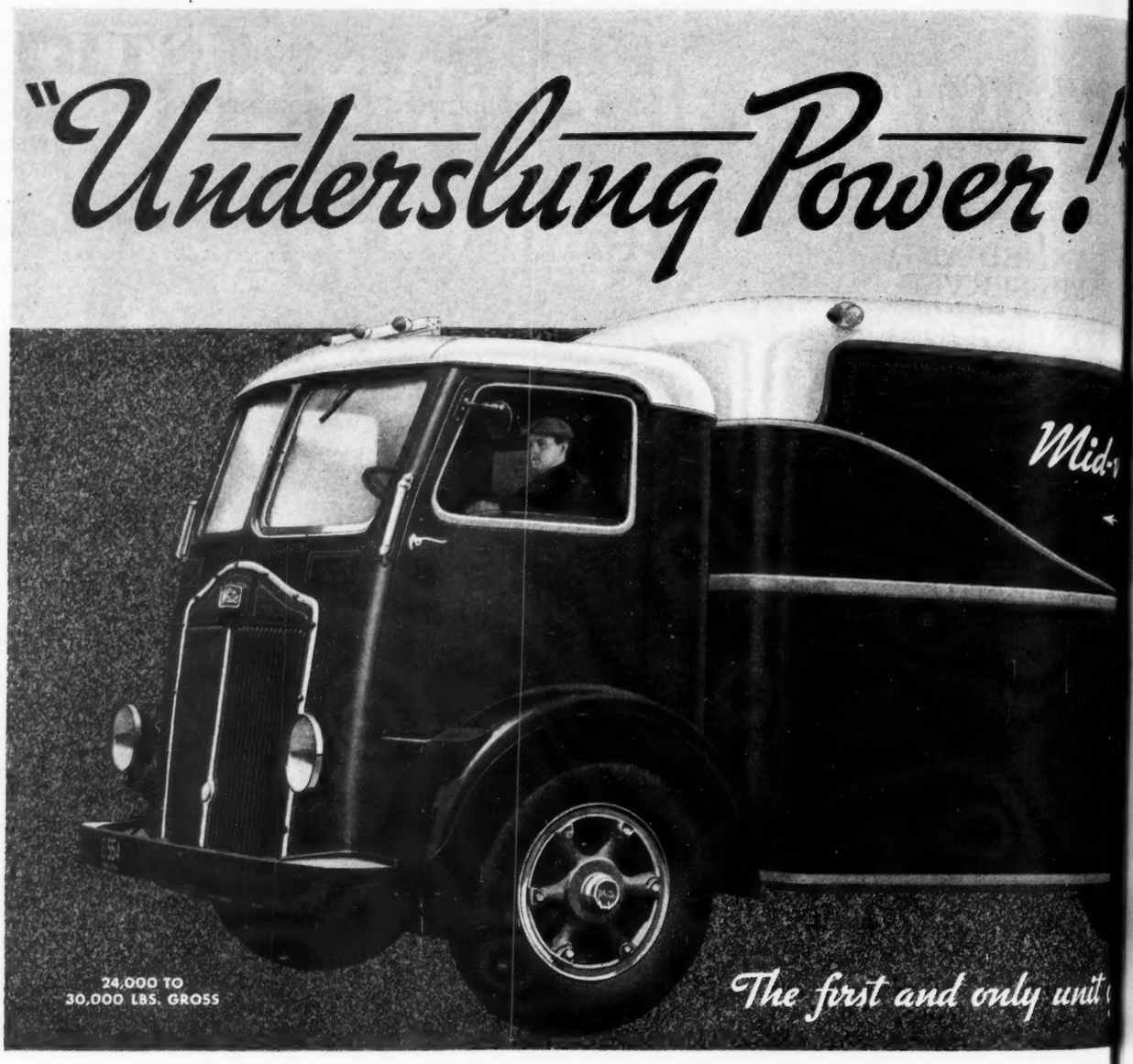
Copyright, 1934, by McGraw-Hill Publishing Co., Inc.

Contents indexed monthly in the Industrial Arts Index

FOOD INDUSTRIES. Published monthly; price 25c. a copy. Subscription rates: United States, Mexico and Central and South American countries, $2 a year. Canada, including duty, $2.50 a year. All other countries, $3 a year or 12 shillings. Entered as second-class matter April 30, 1929, at Post Office at New York, N. Y., under the act of March 3, 1879. Printed in U. S. A. Cable address: "McGrawhill, New York." Member of A.B.P. Member of A.B.C.

McGraw-Hill Publishing Company, Inc., 330 West 42d Street, New York, N. Y.

Branch Offices: 520 North Michigan Ave., Chicago; 883 Mission St., San Francisco; Aldwych House, Aldwych, London, W. C., 2; Washington; Philadelphia; Cleveland; Detroit; St. Louis; Boston; Greenville, S. C. James H. McGraw, Chairman of the Board; Malcolm Muir, President; James H. McGraw, Jr., Vice-President and Treasurer; B. R. Putnam, Secretary.



White completely changes the transportation picture with an entirely new design that places payload and power on a profit basis

★ ★ ★

Now comes an entirely new kind of ultra-modern motor truck for city and inter-city service—a heavy duty White with "Underslung Power"—an important step forward in highway transportation.

"Underslung Power" was accomplished through sound engineering in development of the White 12-cylinder horizontally-opposed engine—the only engine of its kind in commercial use.

Being of the horizontally-opposed type this new engine is flat enough to be placed underneath the floor—with the cab moved forward to the extreme front of the truck. This modern arrangement of power plant achieves perfect weight distribution with the lowest center of gravity, and greater payload space on every wheelbase.

Throughout the chassis White has achieved something new and better. Outstanding features include—shortest overall length with greater maneuverability—White screwed in Stellite Valve Seats—exchangeable wet sleeves—dry sump lubrication—full floating rear axle—silent transmission—unusually wide tread front axle—air brakes—exceptional visibility, and other safety features. Valves on underside of engine—at lowest point of cooling system—insure long life by eliminating hazard of low water. Beltless cooling fan, driven directly off end of crankshaft, circulates air over engine and adds to driver comfort by preventing all heat from

* Copyright 1934, The White Motor Company

FOOD INDUSTRIES

THE NEWS OF • PRODUCTION • ENGINEERING • DISTRIBUTION

Established 1928—McGraw-Hill Publishing Company, Inc.
Volume 6 Number 10

New York, October, 1934 . . . Laurence V. Burton, Editor

What Is the Matter With the Food Business?

LET US leave the constitutionality of the New Deal to the lawyers and analyze our own problems. After we decide what we ought to do, then we must determine how to do it and who should do it.

First of all, what is wrong? Outstanding food executives say that margins are too thin; that the difference between the cost to sell and selling prices doesn't leave enough to do a proper selling job; that volume is slipping because of lack of selling pressure; that reduced volume means higher costs, and costs are high enough already. Net profits, if any, are generally microscopic.

Businesses which have a volume of sales that is based on continuous advertising are particularly vulnerable right now. Experience has shown that, with an adequate appropriation for sales promotion, it is necessary to use about 95 per cent of it solely for maintaining the volume of sales. Ordinarily, only 5 per cent of it can be said to be credited with increasing the volume. Many have never learned this fact.

Now consider the situation which will almost surely arise when it becomes necessary for a corporation to economize by curtailing an adequate sales promotion appropriation by 25 per cent. This seemingly harmless act has the ultimate effect of cutting off the volume of business to about 80 per cent. Unit costs are adversely affected by any reduction in volume, but what can be done about it?

Men in the production department have their part to do. Costs can be reduced. Costs can always be reduced. And production men are the only ones that can do it. Machines can be kept in perfect adjustment to avoid waste. Supplies can be cared for more economically. Adequate maintenance can forestall many a costly breakdown. Water, steam and electricity can be used more economically. Foremen and superintendents can plan with greater care so that everything is done with the least possible cost. And all of these can be done without noticeable cash outlays.

Then there are other moves that can result in considerable savings. A cheaper or a better package can be designed, one that pays for itself in fewer damaged and returned goods, or builds consumer good will and thereby reduces the need for sales pressure. Heat and refrigeration losses can be prevented by proper insulation. Engineering departments can do much to save money by questioning everything.

Research and development departments can examine formulas and processes to determine if the present way is the best way, or if it is the cheapest way to manufacture. Better products can be developed.

Management, of course, shoulders the responsibility for the safety of the whole enterprise. Yet management has its own moves to make. To suggest that management should exercise every care in the purchase of raw materials is to state the obvious. It can, however, often exercise greater foresight than it has in the past. In particular, it should examine its own labor policies and industrial relations, to be very sure that nothing will occur or be allowed to continue that will result in more costly operations.

And, in our opinion, it would be a sound move for management to take its employees into its confidence to a considerable degree. If employees are to be expected to respond to their civic obligations as intelligent people, it is only proper that they should be fully informed about their own jobs—their sources of livelihood.

Margins may be too thin today. Let us see that they do not become any thinner.

AS IT LOOKS TO US

Explaining Important Differences . . .

Furthering our statement on the front cover of this issue, we desire to clarify what we believe to be a cause of conflicting views among those who should be in agreement.

In the period which many contemptuously call the Old Deal there was no immediate threat of change of our economic order or our form of government. Anyone could have a reasonable expectation that a business affair could be consummated under conditions generally similar to those existing when it started. Conditions were reasonably settled and could be expected to persist. And if any changes should come about they would not come unexpectedly, nor could they arise from the decision of a single individual or a small group.

Many a man today has been dubbed a tory or a reactionary because he has favored the conditions of the Old Deal. But if anyone asks for settled conditions, instead of the current turmoil which has its origin in Washington, he is not necessarily a reactionary nor a tory die-hard. He is more likely to be a sensible man.

No real good ever came out of a roughhouse, and certainly nothing worth while can come from an economic rough-house. The most progressive liberal, even if he has remarkable constructive ability, must realize that he cannot accomplish anything definite without first stabilizing and quieting the uncertainties.

Business can be conducted under almost any set circumstances so long as they do not change faster than men can adapt themselves to change. If changes come too fast, the prudent man bides his time and waits.

Those who ask for settled national policies are not reactionary. It should be remembered that the only time when any of us have ever known anything like stable policies and the definite objectives of government was in the years of the Old Deal.

In our opinion, the clock cannot be turned back. To call for a return to the past is to ask for the impossible. Let us be clear in our thinking.

Stable policies, known to everyone, are not only a right but a necessity to all forms of business, irrespective of the political party in power.

General Johnson . . .

The long expected exit of General Hugh S. Johnson from the immediate N.R.A. picture is an event that may have even greater significance than meets the eye. An amazing character, remarkable energy, a complete vocabulary of double- and triple-jointed words that could be uncorked at will, dauntless courage and an iron will were his. His force started things going, a force that was expended without regard to cost to himself, the country or the future. He attacked. Others will consolidate. But, of the true import of his resignation, we shall see what we shall see.

Spare Parts . . .

Some weeks ago, the superintendent of a large plant pointed out with considerable satisfaction that in his force he had quite a number of well-educated men, some of whom were university graduates. High school graduates were plentiful.

Their jobs were nothing more than ordinary labor. Just the ordinary, dirty, menial jobs that most of us have held in our own days of youthful disillusionment.

"Are you running a cadet apprenticeship system?" he was asked.

"No," he replied; "they are working for a living just the same as the rest of us. But we do try to be human—even friendly. We are making a conscious effort to attract and hold a goodly number of them."

"And what is the idea back of that?"

"We like to have a good quality of spare parts ready when we need them."

Meeting Competition . . .

If we were on the board of directors of any food company we would insist that the plant be made a low-cost plant.

High-quality foods, produced at a cost which is a little below the average of that branch of the industry, constitute one of the safest and surest ways to hold one's position against competition.

Furthermore, it is always well to keep in mind that, if newcomers enter an industry, they probably will purchase the best production facilities obtainable. Or, equally difficult to meet, will be the concern which acquires idle manufacturing property at bankrupt prices and therefore has a very small capital investment.

Prudence calls for foresight in this direction.

Unfair Competition . . .

Occasionally manufacturers of food products are faced with wicked competition from other products which are below standard, or even adulterated. Two such cases have occurred within the past sixty days.

To put a stop to such questionable competition is comparatively easy. If you are *certain* that the product is adulterated under the meaning of the Food and Drugs Law, all you need to do is notify the Food and Drug Administration, U. S. Department of Agriculture, Washington, D. C. The government will do the rest, although procedure is necessarily deliberate.

But, before filing complaints it is the better part of wisdom to be positive that the accusation is correct.

Grocery Manufacturing Industries Code . . .

At last the substitute for the master code for the grocery manufacturing industries has made its belated appearance, after a series of vicissitudes that are well nigh incredible.

Thirteen months of effort have been required to obtain a document which, up to now, has been so unsatisfactory to the industries that it had to be revised three times in the last two weeks prior to its "offering" to the interested groups. And not one of them would comment on it until they had seen the official code—an extreme

reticence based on the habit of certain groups within N.R.A. of inserting their own ideas of what ought to be in a code of fair competition *after complete agreement had been reached between industry and the administration officials.*

Industries, be it remembered, are presumed to have the privilege of a code in return for concessions to labor. And presumably the industries write their own codes—a presumption not wholly justified by experience. Zealots within N.R.A. have seized the opportunity to do a bit of code writing on their own, and hence the long-drawn-out battles and delays that would amount to a scandal were it literally true that N.R.A. "works in a goldfish bowl."

Chief among the points desired by industry and permitted by N.R.A. in the proffered code are the prohibitions against split or diverted brokerage, and "destructive" price cutting. Open prices are compulsory, under sensible limitations.

The document has one very good feature. It provides a uniform code under which all manufacturing industries may operate if they desire to do so, even if they are now operating under separate codes.

Only the extreme vigilance of Paul S. Willis and his associates in the industries has eliminated the repeated surreptitious inclusions of many features of the Tugwell and Copeland bills in this code. Members of industry owe them a debt of gratitude, for, without this vigilance, the code authority would be shouldered with the added task of enforcing, at industry's expense, proposed food legislation that failed to pass the last Congress.

So far, the code appears to be acceptable to its sponsors and the indications are that it will be acceptable to the interested industries.

To Avoid Mold Trouble . . .

With the further advance in knowledge of that branch of medicine known as allergy it is gradually becoming more apparent that many of the allergic substances, which cause unpleasant reactions in human beings, originate in molds.

Responsible individuals in the food-manufacturing industries should be very sure that they avoid the possibility of their particular type of food being singled out as a common source of allergy, simply because it might contain the remnants of mold.

It is no sin to suffer an attack of mold in the plant, but it is very reprehensible to allow it to continue. Mold prevention is accomplished by good housekeeping and common-sense measures, such as proper ventilation and storage of materials away from places where molding is encouraged by high humidities. Disinfectants sometimes are a help, but never a permanent cure for mold.

The right cure is *prevention*—by proper sanitation. Sometimes wooden equipment such as conveyors will mold over the week end, but not if it has been properly cleaned and sterilized *and dried.*

Art—and Scientific Research . . .

An important lesson can be learned from the experience of a certain dried-milk company which was attempting to control its products for the needs of the baking industry. Various lots of dried milk were prepared under different, but definitely controlled conditions. In order to test out the results obtained, the milk company employed a professional baker and set up a test bakery in its laboratories. To the amazement of everybody, all the bread from the various lots of dried milk turned out almost identically alike.

The company manager was certain that these results were not correct; that there should be differences—discernible differences—between loaves of bread made up from the different lots of dried milk. Nevertheless, the professional baker in the laboratory turned out lots of bread that were almost identical.

The baker was then replaced by a chemist who knew very little about baking *as an art.* As soon as he commenced to bake bread, using the different lots of dried milk, very marked differences in the loaves became apparent.

Apparently the baker, whose skill in the *art* of baking was undeniable had unconsciously compensated for the differences between different lots of dough, before baking, by his manipulation. Although his instructions were to do everything identically, his long experience in the *art* of producing uniform bread caused him to continue to produce uniform bread despite the variations of one of the ingredients. Only the scientific man, possessing practically no knowledge of the *art,* though skilled in *methods of scientific research,* was able to reveal the true effect of variations of this one ingredient.

In the conduct of tests, it is wise for those in charge to consider very carefully the personal factor which may be involved and to select such tests and personnel as will reveal the facts being sought. Art and science are two very different qualifications. Under some conditions one may supplement the other, while under others one may offset the other.

New Form of Packaging

When small fish are canned, with several in a single container, they are very likely to break up upon removal. This is particularly true of sardines.

Something new is planned, we are informed, to avoid this difficulty. Herring are to be headed and tailed, then gutted and washed. Next they are to be wrapped in parchment paper, and then placed carefully into round cans. One suspects that the idea came to someone who opened a can of hot tamales. The idea sounds rather good. We shall watch this development with interest.

Kettles . . .

Design of steam kettles has been forced to take on a more scientific basis through the adoption of the newer metals of construction, particularly the 18-8 chromium-nickel steels, pure nickel, aluminum, and Monel metal.

In older days the outlet boss was firmly affixed both to inner and outer bowls, as long as copper was the chief material of construction. Such a design does not allow for differential expansion of component parts and forces the metal to bend slightly to accommodate itself to the stresses.

Copper is sufficiently flexible and ductile to permit alternate expansion and contraction, but with the same design policy using stainless steels, the fabricator finds that continual bending results in ultimate fracture.

Today some of the newer kettles are constructed with the outlet boss passing through the outer bowl through a slip joint and stuffing box. This functions as an expansion joint and avoids all such expansion stresses. It further permits welding the jacket and bowl, thus eliminating rivets and frequent leaky points.

$6,000 Worth of Good

Galvanic Currents Gave It a Bad Taste

● Dairy, ice cream, beverage, condiment, fruit juice and other food industries handling liquids will be interested in this quality-control discussion.

● Metallic contamination, brought about by electrolytic action between dissimilar metals, can ruin delicate flavors. What happened in a dairy plant could happen in many other plants. If obscure flavor troubles develop, here is one way to run them down.

By R. L. PERRY
Agricultural Engineering Division
University of California
Davis, Calif.

"THE PLANT is literally alive with electricity. Customers are complaining about the flavor of the milk. It must be caused by stray currents producing electrolysis in the pasteurizers. We need some help to find the trouble and to correct it before more trade is lost." This urgent message came from a dairy equipment house installing new pasteurizers in a San Francisco milk plant, where as much as $6,000 worth of milk was lost through off-flavors that offended customers.

Investigation in the plant confirmed the first sentence. Potentials from a few millivolts up to two-thirds of a volt could be detected between various pieces of equipment, structural members and service piping. Because the plant was adjacent to a street-car line, and because the new units were of stainless steel with shining silvery white sanitary pipe lines, the blame had at once been laid to stray-current electrolysis.

There was no question about the flavor of the milk. Within a short time after delivery, the objectionable flavor, sometimes called cappy or oxidized, became more and more pronounced. This taste, also described as metallic, had previously been shown by the University of California[1] and others[2, 3, 4] to be caused by the dissolving of copper and certain other metals by the milk in its contact with utensils and plant equipment. Not only do the metallic ions themselves impart an undesirable flavor but they accelerate oxidation of the milk fat to produce the oxidized taste.

In attacking the problem, the first move was to obtain samples for flavor tests, which were taken from the incoming milk supply and from successive steps in processing at regular intervals during the morning. These were iced and expressed to the laboratory for examination by qualified flavor judges.

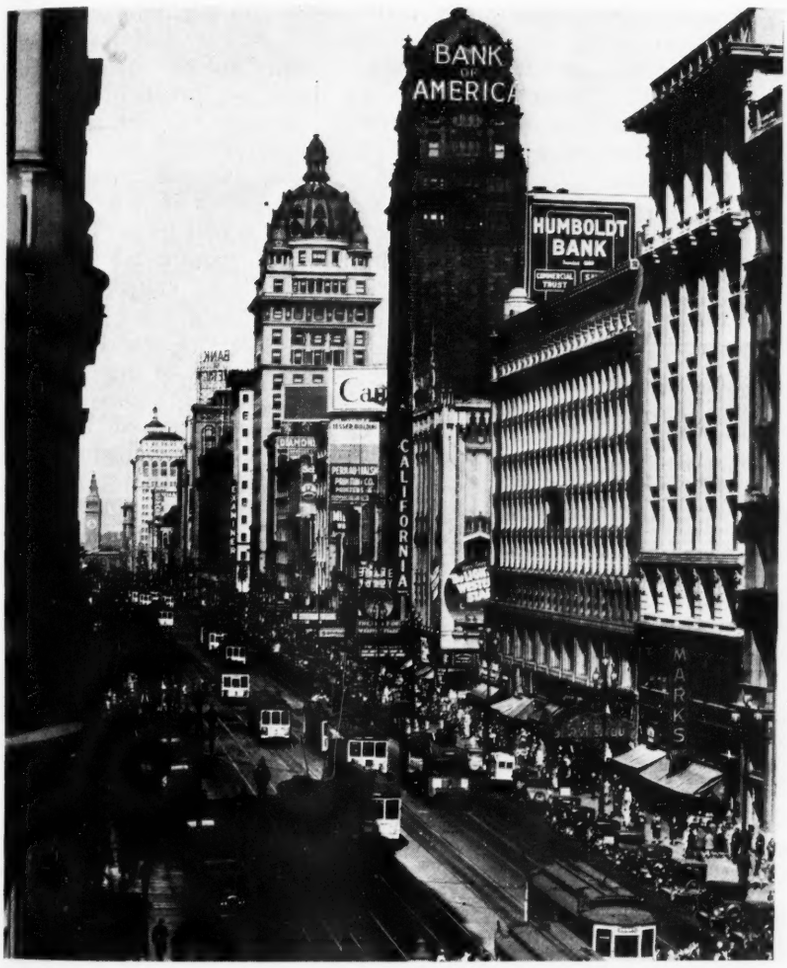
Meanwhile, a high-resistance millivoltmeter was used to make a number of random observations, disclosing small differences almost everywhere, but without any consistent direction, magnitude or steadiness. Between one of the pasteurizers and the water service pipe, carried on wall brackets, a difference of 0.3 to —0.2 millivolt was observed. At the street-car intersection outside of the plant, cars could be seen starting and stopping. Occasionally, it seemed that the instrument needle swung in phase with the successive advances of the motorman's controller as the car started and picked up speed; but at other times, similar oscillations occurred when no street car was visible for several blocks; and again, the needle failed to fluctuate when the car started as usual. It was observed that the frequency with which the motorman habitually advanced his controller was very close to the period of the instrument, so that any transient voltage would show a similar swing of the needle. Unfortunately, an oscillograph for making records of the fluctuations was not available.

A systematic check of the plant was then made. Between the power conduit sheath entering the building and the water service line from the street, about 50 ft. apart, the needle fluctuated to read a maximum of ½ millivolt. From water service to gas service at the rear of the building, the difference was no greater. At other places, higher but steadier values were shown. For example, the difference between the water line and the galvanized frame of a bottler was ⅓ volt, while from the water pipe to a capscrew in a guard channel on a tile wall corner, the difference was ⅙ volt.

From the magnitude and steadiness of these latter readings, it was recognized that they probably were galvanic manifestations. When a resistance of 250 ohms was connected in parallel with the 5,000-ohm voltmeter, the voltage dropped to 1/10 volt, because of the internal resistance loss in sending the current which flowed through the unknown path in the structure and floor to the pipe. Calculations from this data gave the resistance of the path at about 400 ohms; and in the second example,

Effects of galvanic corrosion may be very bad. One dairy plant found the impeller blades of its brine pumps in the condition shown here. Raised letters and numerals on middle blade are due to the protective effect of red lead paint used to identify the blade.

Milk Spoiled



SAN FRANCISCO'S STREET CARS "NOT GUILTY!"

Survey to determine cause of electrolytic action giving off-flavor milk in dairy plant places blame on galvanic effect and exonerates stray currents from trolley lines.

270 ohms. Such voltages might have been alarming at first glance, but they were thus readily characterized as isolated and of no significance.

The suspicious fluctuating voltages having been shown to be of the very small range of less than a millivolt, and the larger steady voltages having been proved innocuous, attention was turned to the milk-handling equipment itself. This was under some suspicion from the first, but was assumed guiltless until possible stray currents were evaluated.

The milk passed from a tinned steel drop tank through a tinned copper line to a bronze pump and up a copper-nickel alloy line to the pasteurizer floor. Stainless steel (18-8) drop pipes, soldered to the copper-nickel line, delivered the milk into stainless-steel pasteurizers. Milk left these through bronze outlet valves to which copper-nickel alloy lines and fittings were attached, carrying it to a tinned bronze pump and tinned bronze filter en route to the tinned copper cooler. Leaving the tinned copper cooler trough, the milk was delivered through a copper-nickel alloy line to the nickel valve in the bottler tanks.

This startling array of metals undoubtedly was a galvanic electric hazard, and, in addition, copper alloys had been shown of themselves to be milk-soluble. It was even found possible to measure voltage gradients along the milk line, in spite of the extremely low resistance of the joints. These were not voltage gradients resulting from stray current drop, because they were successively positive and negative from point to point. They were fluctuating, of course, from the imposition of the transient voltages previously observed, and the other effects from solution temperature differences, velocity differences, aeration differences, and so forth. The fluctuations were not large enough to mask the more constant galvanic differences.

Examination of the milk samples meanwhile had shown that the flavor of the milk as received during the morning varied. The flavor became more objectionable as it passed through from weigh tank to bottler. Blame for the change in flavor could not be placed entirely or constantly upon any piece of equipment, nor was the increase in the off-flavor uniform. This, however, is a normal observation where several units are in service only two or three times each day.

Too Many Metals

From the observations made in this plant, it was evident that galvanic currents were causing most of the trouble, that the exposed bronze and copper-nickel alloy was sufficient to cause oxidized flavors, and that the danger of trouble was enhanced by the presence of the many different metals. Although stray currents might have been aggravating the trouble to some extent, no real relief could be obtained until the copper alloy could be removed or tinned. The metallic circuits were such that the stray currents tended to follow the metal paths rather than the milk paths, while internal galvanic differences caused current to pass from metal to milk and produce corrosion.

The experiences encountered in this and other plants suggested that operators, technicians and mechanics might profit from a brief practical review of what to look for and what to avoid in an electrolytic survey.

In investigating the action of currents in dairies, small direct-current voltages can be detected readily by connecting a voltmeter of the proper range and proper internal resistance between the two points under suspicion. Interpretation of the observa-

tions is often bewildering, however, particularly in the range from ½ volt down. Stray current potentials from street railways are fluctuating, ranging from 0 to possibly several volts. Galvanic voltages are steady, ranging from 0 to possibly 2 volts. Voltages caused by temperature, concentration, aeration and velocity differences are often fluctuating because of changes in plant operation. Static accumulations usually are discharged on contacts, although a rather steady stream of electrons can be drawn from a moving belt.

The direct-current voltages observed are the sum of all the potential differences occurring at the point. In the range between 0 and several millivolts, the less important sources may cause variations which are quite puzzling. Attempts to correlate needle swings with observed street-car movements will be misleading if the natural period of the instrument is about the same as that of the motorman advancing his controller.[5]

Isolated Points

Galvanic differences observed between structural members, pipe railings or floor grids embedded in concrete, on the one hand, and water pipes or conduits on the other, probably are not significant. They can be evaluated by measuring the resistance between them and some good ground, such as a water pipe. A high resistance usually will be found, indicating that the point is isolated from the plant, has little capacity to supply current, and can be disregarded.

Alternating-current voltages and currents are difficult to show, because commercial instruments are not made in very low ranges. A pair of ear phones of proper characteristics can be used to a limited extent, but a vacuum tube amplifier might give more valuable results if used by a competent observer.

The correction of faulty conditions often calls for very careful study. The first step is to avoid the use of dissimilar metals. Until this is done, little progress can be made in other ways. Even where stray current is particularly blamed, the party responsible can dodge behind the counter-charge of galvanic potentials.

The phenomenon referred to as stray current is sometimes guarded against by the use of ground connections. However, promiscuous and unstudied use of ground is likely to do little good and may even accentuate the trouble. Stray currents enter the plant by way of pipe lines which run alongside the car lines at some point. The main current from the street-car wheels follows the rails back to the substation bus, as shown in Fig. 1, but, inasmuch as current will follow all available paths of conductance in inverse proportion to the resistance of these paths, some of it will flow back to the substation by way of the earth and will travel along pipe lines readily, because of their low resistance. Now, the use of grounds may further decrease the resistance of the paths through the pipe and make matters worse. In Fig. 1, for example, if the water company grounds its pipe to the substation bus, *E* to *B*, to prevent corrosion at *E*, the resistance of the circuit *A-D-F-G-E-B* is reduced, and more current will flow along it. This will increase the trouble at *G*. In the plant, it must first be determined whether the ground connection will carry current around the milk-handling equipment, or increase the amount flowing through it.

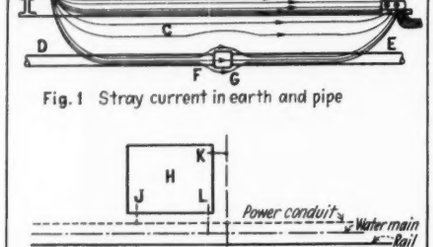


Fig. 1 Stray current in earth and pipe

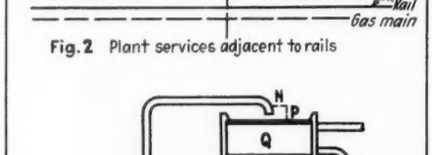


Fig. 2 Plant services adjacent to rails

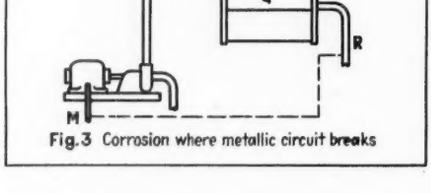


Fig. 3 Corrosion where metallic circuit breaks

Fig. 1—Electric current, after passing through street-car motors, returns to rails by means of car wheels. Most of it then flows back to substation along rails, but some passes through ground and might be picked up by pipe lines paralleling track.

Fig. 2—In a plant with stray-current troubles, it would be useless to ground —say, as between *J* and *L* in above diagram—unless the ground had a resistance as low as that of the external resistance between these two points.

Fig. 3—To protect the milk in the cooler *Q* from electrolytic action, the ground connection *M-R* would be effective, while *N-P* would be even better, giving practically zero voltage drop from pipe to cooler.

On first thought, an attempt might be made to run a ground wire from *J* over to *L*, in Fig. 2, if observations suggest stray current potentials between these two points. It can be seen that the ground wire must have a resistance no greater than the present very low external resistance between these points if it is to reduce the potential to half its present value, which would require an extremely heavy wire. A better treatment might be to place resistance joints in the water service where it enters the plant. If this is done, ground connections at the equipment will permit both sides of it to be at practically the same potential. One such connection is shown at *M-R*, Fig. 3. A better connection is shown at *N-P*, making the voltage drop from pipe to cooler practically zero.

Ground With Care

It must be borne in mind that if galvanic differences from dissimilar metals exist, grounding connections may increase the trouble. If the pipe at *N* is positive with respect to the cooler through *P*, a connection, *N-P*, will allow current to flow through the connection from pipe to cooler and return to the milk from cooler to pipe, causing electrolytic corrosion where the current leaves the cooler.

Although the voltages of the galvanic currents may be low, the paths are short, resistance in these paths is low, and currents of serious magnitude may flow. A silver luster is no guarantee of equal electrochemical potentials, and the use of a corrosion-resistant alloy at one point may actually stimulate corrosion at another.

That the corrosion of metals in dairy plants by electrolytic action is a serious matter there can be no doubt. A corrosion rate too small to affect appreciably the durability and life of the equipment may be large enough to impair the flavor of the product, resulting in dissatisfaction of customers, if not in an immediate loss of business.

The flavor of milk is adversely affected by dissolving various metals, and by oxidizing of the fat. The latter is accelerated by several factors, especially the presence of certain

(Turn to page 482)

Malt Dust *Is Dangerous*

Firemen Turn Water on Small Blaze . . . Explosion Follows . . . Two Dead, 45 Injured

$80,000 EXPLOSION could have been prevented by proper design of buildings and equipment, *and by better housekeeping.*

ANY KIND OF FOOD DUST is a hazard, There is an economic justification for extreme cleanliness and careful design.

MALT DUST will explode under commercial conditions of manufacture and handling unless proper precautions are taken to prevent it. This startling conclusion seems definitely proved by two serious accidents of major proportions which have occurred recently. Fortunately, appropriate precautions are known to prevent recurrence and to minimize consequences of such accidents. The industries making and using malt, however, have an important responsibility in these matters.

The first case of malt-dust explosion on a large industrial scale occurred in Buffalo, N. Y., Jan. 24 of this year, in the course of a fire at the plant of Kreiner Malt Co. Just as the water was being turned on what was apparently a small blaze, there was a terrific explosion originating in the upper stories of the malt house. Two persons were killed, fourteen firemen suffered severe injury, and a loss in buildings and contents of approximately $80,000 occurred.

A second closely analogous case occurred on June 12 at the plant of Kurth Malting Co., Milwaukee, Wis. Fortunately, there were no fatalities, but the financial consequences were of major importance to the concern. Furthermore, this second accident demonstrates that the first was not merely an isolated case which could be ignored by others in the industry.

Investigations of both these accidents have been made by the very capable staff of the Bureau of Chemistry and Soils. The chemical engineers of the Bureau point out two possible causes of such explosions: (1) When a stream of water is thrown on a fire, there may be stirred up dust sufficient to cause an explosive mixture in the air. This was known to have been a possibility in the Buffalo explosion. (2) A possibility is that dust may be stirred up into an explosive mixture with air by a small preliminary "puff" or by the activity of the fire itself. A minor puff is thus followed by a major explosion of devastating proportions where dust accumulations are available and can be so dispersed.

Investigations are being carried on by the Bureau's Chemical Engineering Division. These show conclusively that malt dusts are fully as explosive as other kinds of grain dust. Malting and brewing industries must take account of this, "in order that application can be made of methods that have been developed for dust-explosion and fire prevention in other grain-handling industries." Measures recommended by the Bureau of Chemistry and Soils for all types of dust industries, particularly for grain-grinding plants, should be adopted.

The Bureau recommendations require segregating dusty operations in small space units with appropriate fire- and explosion-resistive walls between such space and other rooms. They also call for use of generous window space, permitting outward venting without much structural damage in any minor exposion that might occur. Of course, they demand good housekeeping, with the prevention of dust accumulations and the minimizing of dust clouds even at those points within the grinding equipment where dust is unpreventable. In many cases inert gas protection is desirable. In addition, there should be appropriate grounding to avoid static electric sparks; proper mechanical arrangements to minimize sources of frictional ignition; and the elimination of flame or other sources of fire where dust may be found.

All that was left of the Kreiner Malting Co. plant at Buffalo, N. Y.

There was only a very small fire in the beginning, but this happened.

If the Next Congress Requires

Industrial Pensions

Here Are the Ways to Set Them Up

By G. CHAUNCEY PARSONS
New York, N. Y.

IN THE last year there has been considerable discussion and even agitation for retirement pension plans for our old-age employees. Railroads, some of the public utilities, and a number of industrial corporations have had such plans for years. Other industries, among them those supplying food products, have shown interest in this subject, with the result that many of the larger companies have installed some kind of pension system.

The present administration is highly in favor of industrial pensions, and it is my belief that pension legislation will be proposed in the next session of Congress. In view of the attitude of the Federal Government, would it not be well for food industries to look into the pension movement, and, further, to analyze the different plans that have been used in the past and to find out whether for each particular firm a pension is a good thing or not?

Out of some 48,000,000 workers in the country about 4,000,000 are now protected by pension plans and approximately 90,000 have already been retired and are now drawing pension benefits.

Some of the leading packers, bakers, package food manufacturers, candy makers, flour millers, and dairymen have adopted pension plans in the past, and in most cases found them satisfactory from the employee-relationship point of view. However, some have been discontinued or changed, largely because of the fact that the plans were not set up originally on a sound actuarial basis. This is the biggest pitfall into which those planning pensions are likely to fall.

Whether a pension plan is good for your industry or not depends upon certain factors; i.e., management, industrial relationship and economic conditions. Most industries have found that a proper pension plan is decidedly advantageous, and the records contain ample data to substantiate this opinion.

From the industrial economic standpoint, I think it is quite obvious that, if we can increase the purchasing power of the community, we automatically establish better markets for our own products. If we could eliminate the care of the aged, or largely eliminate it, taxes could be reduced, for it would not be necessary to raise funds, either through federal or local governments, to support these people as we are forced to do today. Though we may say it is a municipal problem—this care of the aged—the municipality promptly passes the cost, plus political charges, back to the industry itself, which is almost the most expensive way, conceivably, of doing the job.

From the individual company's point of view, a great many factors must be considered. Have we in the past ever provided a pension or its equivalent for any of our older employees, and, if so, are we satisfied that it is a just and correct thing to do? Have we found that by doing this the loyalty and morale of our organization as a whole has been increased? Have we had the annoyance caused by agitators trying to stir up trouble in our plants? In other words, are we a good company to work for?

Though it cannot be proved by figures, those industries that have installed good pension plans have found that the cost as shown by the books is not a true cost. Many of them feel that they have really earned a profit by having a pension plan. They have completely eliminated agitators, because the men will not listen to them. Employees are satisfied with the company—their company—and believe that it is doing the right thing for them. The company is giving them work at a reasonable wage and has seen to it that, when they can no longer work, they are to be adequately provided for.

In the development of a plan for a particular company, many things need to be considered which only a survey will show completely. But some of the basic principles can be outlined.

A pension plan can be financed in three ways. First, by paying the pension out of the payroll as, when and if the employee retires, with no stipulation or guarantee as to its continuance at any time. True, most of the plans so installed meant to continue the pension, but economic conditions changed the plans in many cases, with the result that the old employee's pension was reduced or entirely abrogated. This has happened in the food industries, as well as in others, particularly in Chicago. It has led to many abuses, hard feelings and, most of all, to loss of faith in the management.

The second method is to buy, at the time the man is retired, a single-premium annuity through an insurance company which guarantees the pension to the employee for the rest of his life. From the employee's point of view this is better than meeting it out of the payroll and it is cheaper than the first method, but it is still costly, for the employer has met all the costs and it takes a relatively large sum of money at one time.

The third method, now used by most employers, is the insured plan where a contract is entered into between the employer and an insurance company which guarantees the fund and the pension in return for a regular premium. By this method the plan

is soundly funded from its inception. Furthermore, the employee shares the cost and therefore has a much better appreciation of the benefits. The obligation under the pension plan is met from *current* earnings while the employee is an active worker on the payroll. If the cost is not met in this way it must be passed on to future management and future profits.

Compound interest has a chance to work under the insured plan, and the costs to the employer are materially less, often as little as 25 per cent of that under the single-premium annuity basis, which, in turn, is less than meeting it out of payroll.

Naturally it is impossible to estimate costs, for only a complete survey and setting up of a plan for a company will show exact costs.

Details of a Pension Plan

Normal Retirement Age: A fixed age should be stated for normal retirement and would depend on many factors, but is usually 65 for males and 60 for females.

Pension Amount: The amount of pension payable beginning at normal retirement should be more than enough to meet bare necessities and should approximate the standard of living to which the employee has been accustomed in the past.

From 1½ to 2 per cent of salary or wage multiplied by the number of years of service from the installation of the plan to date of retirement will usually prove adequate for the amount of annual pension. There should be also a credit for service already rendered amounting to 1 per cent of salary multiplied by the number of years of service.

Employer's Contribution: The premium paid by the employer should be adequate to cover current pension requirements, preferably paid monthly and not subject to withdrawal due to change of management, merges or other extraordinary circumstances. However, there should be a return to the company, with interest, under certain contract restrictions if the employee leaves before retirement age. The amount required should be approximately 50 per cent of the total cost.

Costs will vary with different employers, depending upon age groups of employees and percentage of females in the company's employ, and will usually amount to 3 to 5 per cent of payroll—sometimes even lower.

The cost for the purchase of past-service credit mentioned previously is usually paid for in one single premium. However, this can be amortized over a period of years. The amount again depends on age groups and length of past service.

Employee's Contribution: The employee's contribution should be approximately 50 per cent of the total cost of the pension. If the employee leaves or dies before retirement, the fund so created plus interest should be returned to him, or his estate, or be available to him in the form of a paid-up pension beginning at normal retirement age. Under certain conditions the employee would also receive the benefit of the employer's contribution, but only in the form of a paid-up pension beginning at normal retirement age.

Probationary Period: There should be a probationary period before employees are admitted to the benefits of a pension plan. This will vary anywhere from six months to two years—sometimes even longer. The reason for this is to eliminate as far as possible the transient employees or the type of employees that are engaged for only a short period of time, such as extra help.

Lay-off Provisions: Provision should be made in the plan for lay-off, so that the pension plan can be continued or held in abeyance until the lay-off is over. Many food industries have more or less seasonal employment. It might be advisable to cover some of these employees; but without the lay-off provision it would be impossible to do so.

Protective Provisions: Certain legal aspects must be included in the contract to protect both the employer and employee fully. One of the particular points is that provision should be made for the cancellation or change of the pension plan in the future if necessary. However, this would in no way affect the pensions purchased up to the time of change or elimination. The plan should be so written that provisions can be made for any changing conditions.

Privileges: All employees should have the privilege on or before retirement age of selecting other types of annuity forms under certain contract restrictions, as no one can foretell what his economic condition or family obligations will be in the future. The employee might desire a joint survivorship annuity covering himself and wife or himself and a child, or if he had no dependents he might want a straight annuity which would give him a slightly higher return.

Certificates: A certificate or booklet should be issued to each participant fully explaining the plan in simple language, so that there is no possibility of misunderstanding later.

The history of the past few years has proved conclusively that most people have made haphazard investments, even over a long period of time, and that this method has hardly been productive either of results or peace of mind. The only way we can have peace of mind and an independent future is by financial investment over a period of years, so that we completely avoid the hazard of loss, not only of principal but of interest. Fortunes have been made by a few through speculation, but the great majority of our citizens have lost eventually through the collapse or partial collapse of their investments.

Life insurance has been the one investment that has stood the test of

(Turn to page 466)

- Autumn and general elections are approaching and the political future is very uncertain. The President has already promised further social legislation as one of the next moves.
- If the country returns a huge Democratic majority to Congress, industrial pensions will be almost a certainty in the future.
- The time is now here to give thought to this eventuality and to lay careful plans to meet the problems of such industrial pensions if and when they may become a legal obligation.

Apparently in anticipation of a big demand for industrial pension insurance, a general rate increase, effective Sept. 1, 1934, was announced by many insurance companies on July 11.

Raisin Oil

A Byproduct of Unusual Value

Warehouse containing 2,000 tons of cured grape seeds from which oil is recovered as a byproduct of the raisin industry. At its peak the industry in California produced 4,000 tons of seeds annually.

By ALBERT M. PAUL
President and General Manager
California Products Co.
Fresno, Calif.

¶ Even the strictest interpretation of the existing food law, or any of the various substitutes for it which have been proposed during the past session of Congress, could hardly be made into a prohibition against turning a product inside out. In a sense, that is what has been done in the raisin industry.

• If our memory is correct, the earliest attempt to produce seeded raisins that were not sticky centered around oiling them with a spray of paraffin oil. Although the method was entirely satisfactory from a technical standpoint, it introduced certain labeling complications because federal law would require such a product to be labeled in a way that would permit a hostile critic to say the raisin manufacturers had covered their raisins with a mineral oil.

• Very properly, the manufacturers failed to proceed with this plan, despite its technical excellence. But with raisin oil available, made from the seeds of the raisins, the oil could be spread on the outside of other raisins to prevent the stickiness and yet not run into labeling problems that might be awkward in the channels of distribution.

• Hence we say that turning a product inside out—that is, putting the oil of the seed on the outside of the raisins—cannot be construed as a violation of any food law that we ever saw.—*Editor*.

ONE of the most intriguing phases of business is the manufacture of something out of nothing. This conversion of waste material into byproducts has expanded with increased acceleration until today many of the commodities manufactured by industry as byproducts represent a very conspicuous portion of the whole output. The discovery and application of the ways and means for the production of these supplementary commodities represent one of the fascinating chapters in the history of American industry.

Industrial history is replete with outstanding examples of what has been done in this way. Reworking of the ore dumps in the mining industry, profitable use of sawdust in the lumber industry, utilization of paper pulp from waste paper are but a few of many examples.

In the raisin industry we have another and no less interesting example of this conversion of waste into a byproduct. To the average person it may be a little difficult to grasp the fact that there are sold each year approximately 200,000 tons of raisins. The industry provides the channel through which are marketed these dried grapes, chiefly of the Thompson seedless and the Muscat varieties, which are produced almost exclusively in the two great valleys of California—the San Joaquin particularly, and in the Sacramento Valley to a lesser degree.

In order that the Muscat raisins may be readily usable as human food, the seeds must necessarily be removed. Seed from the seeded Muscat raisins comes to the California Products Co., of Frenso, Calif., from all of the seeding plants in that locality. It would be accurate to say that the

seeds come from all of the seeding plants in that State, because outside of this place no seeding is done.

Probably in no other place in the world could one find an accumulation of as much as 2,000 tons of cured grapeseed. The industry has produced, and may produce again, as much as 4,000 tons of seed annually. When the small seeds are removed, it is impossible to avoid, at the same time, the removal of a part of the meat or pulp of the raisins. Therein is suggested the first step in recovering values which might otherwise be thrown away, for this pulp is approximately 80 per cent dextrose.

While there is a normal theoretical hog-food value for this pulp and seed, it has no such actual value except when the seed itself is ground. But if it were attempted to transport ground raisin seed for even a nominal distance, or to accumulate these seeds in their wet condition in large quantities, the entire mass would begin to ferment and destroy any food value which they might contain.

The recovery of such values as we knew existed in the seeds was the incentive for setting up the plant of the California Products Co., 34 years ago. Each year since then it has handled all the seed that was produced.

Seeds and pulp are first subjected to a sequence of washings with clear, warm water. Thus the sugar is dissolved and this wash water, containing 12 to 14 per cent of sugar, is diverted to fermenting tanks to convert this grape sugar, or dextrose, into alcohol. Subsequently, the fermented solution is distilled and then redistilled into 191-proof brandy syrup and is sold under government permit to the manufacturers of sweet wines or for any other purposes for which grape alcohol or high-proof brandy spirits may legally be used.

The seeds are then dried, rotary steam dryers being used for the purpose, and then they are stored in bins for curing against the time when a sufficient quantity has accumulated to justify crushing and recovery of the oil which the seeds contain. Raisin seed of this type normally contains about 15 per cent of oil. To recover the oil, much the same process is followed as that which is used in all vegetable-oil plants. The sequence of grinding, cooking, hydraulic pressing is pretty well standardized. The resultant cake from the hydraulic presses, equivalent to the proverbial "squeal of the pig," finds use in stock seed, fuel and fertilizer, while the oil has a wide range of uses.

One of the most interesting uses of the oil is its return to the point of origin. A few years ago, one of the enterprising raisin manufacturers found that by passing the seeded Muscat raisin through a series of steps, one of which included subjecting it to a fog of raisin-seed oil, giving the entire surface of the raisin a thin coating of oil, it produced a very superior product. Instead of the old sticky mass of dried raisin, there was produced a free-flowing product that was no longer sticky.

It was found, too, that raisins so treated remained soft and pliable for a longer period of time than without the treatment; that they were less subject to insect infestation; that their appearance was enhanced and that they could be satisfactorily packed in transparent packages. They were super-cleaned, and took on a brighter and shinier appearance. This type of oiled raisin is now firmly intrenched in the domestic and foreign markets, for the flavor of the Muscat raisin is particularly appreciated just as is the case with Muscatel wine and brandy.

When using the seeded raisin of yesterday, the housewife had to break apart a sticky mass, and flour her hands so as to separate the individual raisin units. The idea of treating the product immediately after seeding and to give it this thin coating of raisin-seed oil has served the purpose of continuing this product in the market, instead of allowing it to be supplanted by the less tasty, seedless variety.

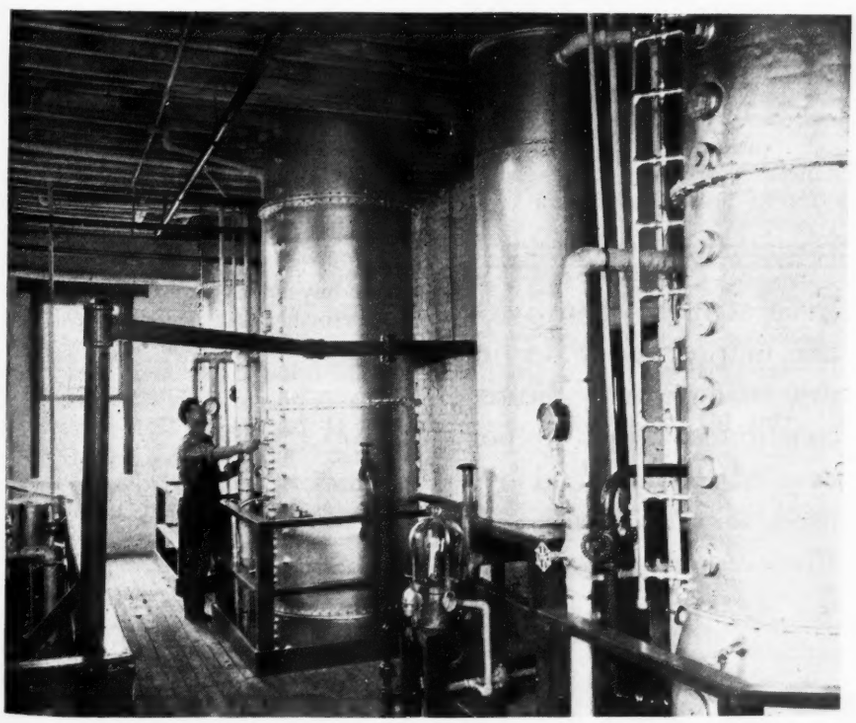
The quantity of oil used for this purpose is nominal, for, due to the excellent spreading quality which this particular oil possesses, only three-fourths to one gallon per ton of raisins need be used. Only the highly refined oil is usable, lest objectionable rancidity develop and compete with the attractive flavor and aroma of the raisin itself.

The transparent package has found many uses, but only recently has it come into wide acceptance in the packaging of dried fruits. It was found to be far more successful to package an oiled raisin, either the seedless or the seeded type, than to try to package natural or untreated raisins. Packaged untreated seedless raisins cloud the Cellophane and present an unattractive package, while with the oil treatment, the rich color attracts the eye of the purchaser.

Raisin-seed oil finds favor as a salad oil; it blends perfectly with olive oil, and by some it is preferred above all others. When used in mayonnaise, it produces a product especially free from excess greasiness, and the product stands up well under both hot and cold conditions. Its high fire and flash tests suggest its

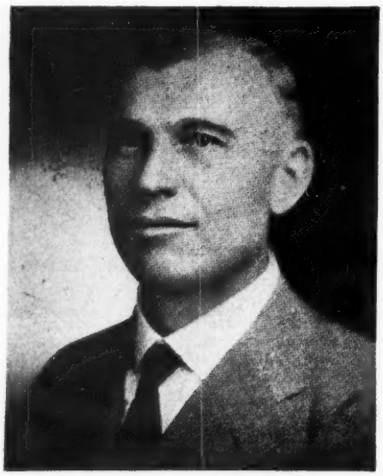
(Turn to page 466)

Seeds and bits of pulp from seeded raisins are washed to recover sugar content. This sugar water and grape juice, when available, is converted into alcohol, otherwise known as high-proof brandy spirits, for fortifying sweet wines.



Butter

As an Ingredient of Commercial Foods



By F. W. BOUSKA
Superintendent of Manufacture
Beatrice Creamery Co.
Chicago, Ill.

AMERICANS consume in some form or other two billion two hundred million pounds of butter annually[1]. Which is to say they eat it at the rate of 17 to 19 lb. per capita; a poundage and at a cost greatly in excess of any other fat. The majority of fat consumers choose butter because they like its taste and not because of the calculated calories and vitamins needed. In fact, flavor is the principal feature that distinguishes it from other fats. For this reason the commercial grading of quality and the price of butter depend more on flavor than on any other factor.

The first requirement is that taste and smell be clean and free from foreign taint. But this is a negative requirement and to rise above this level butter must have a characteristic pleasing taste called flavor and odor called aroma. These are butterlike in character and very difficult to describe; the only adequate way to gain a conception of them is to taste and smell a good specimen of fine butter.

We hear much of "I like this, but I don't like that"; "some persons like one thing and others like another." Is, then, butter quality a personal preference without national and international standards? Indeed not. There is a well-recognized national and international standard of quality. Good butter in Chicago is also good butter in New York, London and Berlin. Poor butter is poor butter everywhere. I do not mean that cities and provinces do not have minor preferences and dislikes. They do have them. But if they really want to buy butter they will accept the better quality from any of the countries that have a reputation for making good butter. Butter is an article of international commerce.

The next point of preference for butter is its plasticity, or convenience in handling and spreading at room temperature. This feature is called body by the butter scorer. Butter should be compact, free from cavities, free from large drops of water or oozing water. This defect is called leakiness. For sale in tubs the cut surface of butter should not be dry and lusterless like cheese, but should sparkle with a few small droplets of moisture about the size of pinheads. When bored with a trier it should cohere in a smooth, solid plug without raggedness in the plug or adhesion to the back of the trier. This plug, if not too cold, should have some degree of cohesion and elasticity without being brittle or crumbly. The moisture must be clear, not milky.

Even at more than twice the market price of its nearest competitor butter constitutes about 40 per cent of the fats and oils used for food purposes. Flavor appears to be the reason.

◆

Practically all the energy and vitamin value of butter is in the fat; the other 20 per cent of non-fatty constituents has little energy. In theory, the pure fat would supply all physiological requirements. But butter without water would be like bread without water and air cavities, or apples without water. The art of butter making has combined the fat, water and curd in such manner that it best suits one's esthetic sense.

Color is an essential and distinctive characteristic. Butter is the only edible fat in large volume that has a naturally yellow color. The degree of yellow may vary according to feed or season and according to market or buyer's preference. The color must be uniform and free from mottles or streaks. There should be no specks such as curd or foreign matter.

Butter is made with or without salt, as the buyer may desire. Salting must be uniform and free from grit. The percentage is as the buyer wants, usually below 3 per cent, and rarely above. Considerable butter is salted only 1½ per cent. The presence of salt accentuates flavors, especially the bad ones. I think it reduces aroma.

The package should be uniform and clean.

The larger cities have butter exchanges which prescribe rules for transactions and for grading. The large exchanges employ professional butter scorers. The buyer or seller may also have the butter graded by

[1]U. S. Department of Agriculture, Bureau of Agricultural Economics statistical report on United States production, trade, and consumption of fats and oils, 1912-1933; dated March 1, 1934.

Uses of Butter as an Ingredient in Foods

Uses	Always	Usually	Occasionally	Not Often
BAKED PRODUCTS				
Milk bread	●			
Cake, many kinds		●		
Soda biscuit		●		
Tea biscuit		●		
Cookies, many kinds		●		
Rolls, many kinds		●		
Coffee cakes		●		
Danish pastry		●		
French pastry		●		
Slavic (kolach)		●		
Corn breads		●		
Muffins		●		
Griddle cakes		●		
Waffles		●		
Puddings		●		
Butter crackers	●			
Wafers		●		
Zwieback		●		
Sandwiches (sweet)		●		
Sandwiches (ordinary)		●		
Fillings (cake)		●		
Fillings (pie)				●
Puff Pastry		●		
Icings		●		
Pie Crust				●
COOKED FOODS				
Soup, factory made		●		
Soup, home made				●
Oyster soup		●		
Eggs		●		
Gravy			●	
Vegetables		●		
Macaroni		●		
Spaghetti		●		
Noodles		●		
Meats, broiled		●		
Meat dishes			●	
Fish and shell fish		●		
Fowl		●		
Game		●		
Pop corn		●		
SAUCES				
Hard sauce	●			
Lemon butter	●			
Anchovy	●			
Hollandaise	●			
Bearnaise	●			
Bechamel	●			
White (cream)	●			
CONFECTIONERY				
Factory made			●	
Home made		●		
Chocolate cream		●		
Butter scotch		●		
Karmel korn	●			
ICE CREAM		●		
RECONSTITUTED MILK	●			
OLEOMARGARINE (Made from animal fats)	A small proportion of butter added			

an inspector of the U. S. Department of Agriculture. Scoring is on a scale of 100 points and the grades are as follows:

93 or higher—Special
92 —Extras
90 to 91 —Extra Firsts
88 to 89 —Firsts
Below 88 —Seconds

Few people, except butter dealers and experts, recognize the refinements of quality above 90. The higher scores require freedom from all "off-flavors" and, in addition to this, a positive pleasing buttery taste and aroma. The more of this positive quality the higher the score and the more difficult the substitution with margarine on the consumer's table. An 89-point butter has one or more distinct off-flavors, but not very conspicuous. It is used as a spread for bread by some consumers. An 88-score butter has very noticeable off-flavors, and is not liked as a spread for bread. Both the 89- and 88-score butters are comparatively free from very undesirable flavors such as oils, tallow or onions and they are used considerably in cooking and baking. Sourness, rancidity and cheesiness disappear in cooking.

Keeping Quality Important

Keeping quality and hygienic quality are not on the commercial scorecard. Nevertheless, they are very important and it is its dependable keeping quality that elevated butter from the chaos of thirty years ago to the standard article of today sold on the futures market, stored for time of need, or sold on track at the factory. *Pasteurization,* made dependable by mechanical and bacteriological control, produced this keeping quality and hygienic safety. Far in advance of other dairy industries, the creamery pioneered and voluntarily adopted pasteurization. Intelligent *control of acidity* is the other element of keeping quality. The average acidity of satisfactory butter is 0.02 to 0.05 per cent expressed as lactic acid. At acidities around 0.10 per cent or higher the fat is unstable. At acidities below 0.02 per cent the proteins are unstable and they putrefy rapidly at the neutral point or below.

The manufacture of butter is an art as well as a science. The judging of butter quality is largely an art. Art is therefore very important in diagnosing butter defects. A keen, discriminating sense of taste and smell and intuition from familiarity with butter are great helps.

In Table I is a list of butter defects

in two groups, one according to taste and the other in appearance. The approximate relative prevalence of these defects is indicated by order and number, the nearer to the top of the list and the smaller the number, the greater the prevalence.

Table I—Defects in Taste and Smell of Butter

Biochemical

1 Neutralizer
2 Greasy
3 Sour
3 Old Cream
4 Cheesy
5 Fetid
6 Tallowy
7 Metallic
7 Woody
12 Rancid
20 Fishy
21 Musty
22 Too Salty
23 Yeasty
24 Bitter

Feed and Absorbed

1 Onion
2 Oils
2 Weeds
5 Food

Defects in Appearance and Feel of Butter

A—Color

1 Mottles
2 Streaks
3 Too much or too little
4 Mold
5 White Specks
6 Green Specks
7 Yellow Specks

B—Body

Grain
Texture
1 Dry and sticky
2 Loose and Spongy
3 Leaky
4 Mealy
5 Greasy
6 Milky

C—Salt

1 Uneven
2 Gritty

The number of defects enumerated may give the reader an exaggerated impression of the prevalence of butter defects. One must remember that a butter laboratory is like a hospital—only sick people come there. The larger proportion of butter is very good and only a small proportion is poor.

The first consideration in diagnosing a defective flavor is the character of the taste and smell. These often indicate the cause of the bad flavor, or they indicate what further tests to make. The acid test of butter detects two important fundamentals. A chemical or bacteriological test for pasteurization reveals whether poor keeping quality was caused by weak pasteurizing or no pasteurizing.

Green spots on prints of butter are caused by copper or brass. If the spots are throughout the butter they probably are due to verdigris from metal equipment. If the spots are only on the surface they may come from metallic scales or the lining paper.

There are two types of defects of texture: underworked and overworked. If the texture is crumbly and moist, like cottage cheese, the butter is not worked enough. If the texture is dry, brittle and fractures comparatively straight, like soap, it is overworked. A texture that feels mealy in the mouth may be caused by crystallized fat, particles of lime or of curd. Crystallized fat melts in the mouth or between fingers. Whether grit or white specks are lime particles or curd is ascertained by removing the fat and treating the particles with weak acid. Lime dissolves in weak acid, usually with effervescence; curd does not.

Keeping quality may be tested by keeping the butter in small jars (2 oz.) at 60 to 65 deg. F. A "poor keeper" develops an off-flavor in a few days, while a "good keeper" deteriorates one point and is still edible at the end of two weeks.

Butter as Shortening

The flavoring property of butter is applied in other ways than as a spread for bread. Butter is used as an ingredient of many foods to which it imparts a distinctive flavor not obtainable by other means. In baked goods it also exhibits excellent shortening properties.

A large baker expresses the usefulness of butter in baking in these words: "Butter is used in milk-bread to comply with government standards, which require the use of whole milk solids or its equivalent. It is preferable to use butter and skimmed milk solids rather than whole milk because of the added flavor and shortening value of the butter. The milk fat of whole milk has no shortening value and does not add materially to flavor." Another large baker reveals the extent to which he uses butter as follows: "Of the more than 500 different varieties of cakes and cookies baked by us, the majority of the sweet varieties, sandwich goods, cookies, hard sweets, various assortments, butter crackers, zwiebacks, wafers, tea biscuits and soft cakes are rich in butter."

It is used extensively in cake manufacture where flavor, shortening value, creaming properties and color are desirable characteristics. Whipped with sugar it is the foundation of fine cakes, in which it produces lightness and fine texture. In fact, a larger proportion of butter is used in cake than in any other food. In this case it is not material, from the viewpoint of cake flavor, whether salted or unsalted butter is used, because the quantity of salt so added is hardly appreciable to taste, and more salt usually is added. However, cake bakers prefer salted butter because it is less subject to mold than unsalted. As cake bakers store a large supply from the May and June surplus of butter, good keeping quality and freedom from mold are of value.

In fillings and icings, flavor, creaming qualities and color are the desirable butter characteristics.

The advantage of resistance of salted butter to mold applies to butter for all uses. Furthermore, unsalted butter develops a cheesy flavor on the surface quite regularly and very much sooner than salted butter. Nevertheless, unsalted butter is preferred by some consumers as a spread for bread and preference for it has been increasing during the past thirty-five years. Unsalted butter usually is used in making reconstituted milk and ice cream mix. In times of unusual demand for ice cream or times of scarcity of sweet cream, a great deal of butter is used in making ice cream mix. Here salted butter may be used with good results and sometimes it is so used. Considered as an ingredient of food, butter flavor and price are far more important than salt or no salt.

High Quality Demanded

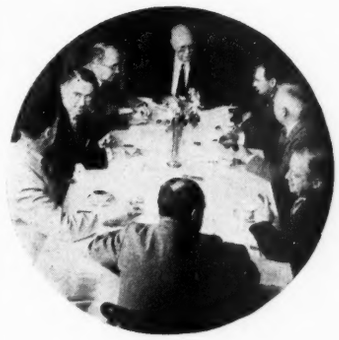
Salted butter is desired by most food manufacturers except for ice cream and reconstituted milk. Some confectioners purchase butter oil, which is the milk fat of butter separated from its non-fatty constituents. Those who answered my questionnaire stated they required 90-point quality or better. The large manufacturers purchase butter in 60-lb. tubs.

Butter made in May and June has the highest color and flavor. Oleomargarine manufacturers store a supply of this butter for the whole year because it imparts the most color and flavor to their products. For the same reason some bakers also secure their year supply in the spring.

Butter is not just a mixture of water, curd and one kind of fat, "butter fat." This butter fat is a natural mixture of at least nine different fats. Several of these are aromatic and found only in milk fat. These are unstable and spoil easily. Butter absorbs odors from air avidly and retains them tenaciously. It should be kept away from odors, light and air, all of which cause rapid spoilage. Cold and dryness favor keeping.

Note—Appreciation is expressed to dietitians and many food manufacturers who generously furnished information for this article.—Author.

Are Your FLOORS *Well Lubricated?*



By OSCAR J. SCHNITZ
New York, N. Y.

A PROMINANT manufacturer of pastry goods dropped into his noonday luncheon chair. His usually serene countenance was distinctly troubled.

"What's the trouble, Tom?" somebody asked.

"Oh, it's just one of those things. Just one of those devils in a manufacturer's life that take the joy out of it," he began while ordering his lunch.

"Two more of my men—good ones, too—out in the mixing room, slipped up on that damned greasy floor again and sprained their backs. Of course," he continued, "I can't stand out there and watch them all the time; besides, they should know by now that those wet spots are slick; but just the same, I can't help feeling that I am more at fault than anyone else."

We all tried to convince Tom that he shouldn't let a good business mind worry over a little wet spot. But it didn't work. It was no joke to him.

"Why shouldn't I worry? Do you call it good business when your employees are spending half their time in the hospital on company expense? Or to waste a lot of time teaching extras how to do the work; then lay awake nights worrying for fear they also will try to break their necks? Bah!"

"Well, Tom"—it was the "close friend" who was speaking—"sounds pretty tough, but you must like it or you would do something about it—seems like."

"Do something!" fairly shouted Tom. "Those floors have been a nightmare to me for over two years, and I have done everything."

"Yeah?" queried the close friend, "Everything? That's a big order."

"That is just what I mean," said Tom; "everything; and in two or three ways. The floors were all wood when I took the plant over. They were always wet and sour, and you couldn't even make them look clean; the cracks filled up with dough and rancid lard, and the boards warped and split. The first thing I did was to replace these wood floors with tile. Tile looked and smelled better and kept smooth, but it stayed wet all the time just the same, and seemed to be even slipperier than the wood."

Slippery Floors Are No Joke

Everyone at the table, except Tom, shook his head. It looked bad!

"Then, someone suggested I use sawdust. You know—sprinkle it around on the floor, as in some meat markets. That kept the floor dry enough, but if we didn't wet it every little while, traffic would soon make a floating dust of it; and when it was wet, it soon got moldy and sour. Besides, it stuck to the workmen's clothes and their tools, and from there it dropped onto the tables and into our cakes. If I hadn't stopped that, the sanitary inspector would have."

"Is that all you have done?"—the close friend was most persistent.

"No, it is not," promptly replied Tom. "I next tried sand. Thought I had it then. There was no slipping with that; the men didn't mind it, and it was cheap; besides, it wouldn't get sour like the sawdust. Of course, when it got dry it too was awfully dusty; nevertheless, I was feeling pretty good about it all until my engineer complained that it was taking most of his time replacing hot boxes in the machinery. The dust from it was just like emery in the bearings. But the final blow came when a lot of my goods came back with sand in 'em. I found out the sand was sticking to my workers' clothes and their tools just as the sawdust did."

That drew a laugh from the whole table, but the friend still insisted: "And is that all you have done, Tom?"

"No, that's not all. I next used salt. Salt cost more money, but it seemed to be just the thing—at first. It stopped the slipping, didn't get dusty nor sour, and I figured it wouldn't break any customers' teeth if it did get in the cakes. The salt crusade brought its Nemesis along with it, however, for pretty soon the men began to complain about the floor being wetter than usual—you know, the stuff draws water—and that their shoes were soaked all the time. Next, they said their shoes were rotting away, and that their feet felt pickled. Finally, my baker said it was taking the 'personal touch' out of his batches by changing their flavor."

Tom stabbed a potato with the evident relish of an angry bumble bee; but the best friend was not through yet.

"So that is all you have done!" he sneered. "Haven't you ever tried scrubbing your old floors? Taking that layer of muck off of them? You grease the moving parts of your machinery so that they will slide without friction, but you allow a film of slick, slimy material to accumulate on your floors, then worry because your men slip up on them."

Tom couldn't eat peacefully with that challenge in the air. He gulped the potato. "Scrub?" he growled. "Scrub? Why, man, I've got twice as many janitors now as I had when I was using sand. They scrub the

(Turn to page 451)

Easy Way to Determine the *Center of Distribution*

By K. B. KEEFER
MacDonald Bros., Inc.
Boston, Mass.

FACED with the necessity of a decision on a new central garage of sufficient size to house and service all of its scattered units, it became necessary for a large truck-leasing company to determine the proper location of the new garage, somewhere very close to the economic center of distribution. The problem originated in the need to improve the profit position of the company and also in the impending expiration of an important lease.

Several widely separated garages were operated by the truck-leasing company, each of which stored, serviced and made minor repairs on about 50 trucks and passenger cars. Overhauling and major repairs were carried out at a central repair shop. The majority of the truck units were leased on long-time mileage contracts which required their availability at the several plants each morning, and their return to the home garage each evening. The distance of this "free" travel was of considerable importance because this mileage was not chargeable to the client. Advantages of a central location for all the vehicles were believed to be twofold: reduction of "free" mileage to a minimum; and consolidation of personnel.

But the problem remained of determining where the central garage should be theoretically located. This location is designated as the geographic, economic center. Obviously it would be possible to discover that the theoretically proper place might be a wholly impractical location because it might fall in a park or river or an expensive residential section. Hence, after determining the geographic economic center, other factors would require shifting the location to a final or practical economic center, probably near to the geographic center.

The theoretical or geographic economic center was determined in the following manner: On a large-scale map of the city were spotted the locations of each of the several original garages, as well as the location of the plants of each client of each garage. At the location of each plant was affixed a gummed dot of suitable color to distinguish from which garage each client was served. On each dot was noted in ink the number of regular trucks required at that point.

The information thus available was then transferred to a rectangular piece of corrugated board by pricking the board through the map at each dot and then noting at each point the number of trucks to be used at that location. Empirical analysis gave the approximate determination of the economic geographic center for each individual garage's clients. But because of the complication introduced by the existence of several individual garages, the proper location of the consolidated central garage was difficult to determine by such a method.

As an alternative of greater accuracy, small weights in proportion to the number of units at each location were used. The center of the whole system was located by actual physical balancing of the board on the point of a pencil. BB shot furnished a convenient cheap form of weight for this purpose. These were fastened to the corrugated board by merely pressing them into its soft surface.

The theory underlying this method of determination was the "resultant of forces" which states in effect that any series of weights in a horizontal plane can be reduced to one single equivalent force and balanced by a counteracting force operating at the center of gravity of the system.

In arriving at the center of gravity

of the system, due consideration must be given to the variations in distance as well as to the variations in weight. Thus, one truck located at a distance of 4 miles from the center is equivalent to two trucks at 2 miles; or one BB shot at 4 in. is equivalent to two shots at 2 in.

It was appreciated that the plane used, corrugated board, because of its weight would introduce an error into the determination. Simple computations furnished a correction for this error. The weight of the cardboard was accurately measured, the center of the gravity of the board alone was located at the intersection of its two diagonals (a rectangular piece had been selected), the weight of the total number of shot used was accurately measured and the balance point of the whole system of board plus shot was located. The distance between the center of gravity of the board and the balance point of the system was then measured. A line drawn between these two points and extended will pass through the center of gravity of the shot alone. This is the point desired, and is located "X" in. from the center of gravity of the system.

Without becoming technical and giving the derivation of the formula,

$$X = \frac{Wc \times D}{Ws}.$$

In this formula Wc is the corrugated board weight, D the distance between the intersection of the corrugated board diagonals and the balance point of the shot-corrugated board system, and Ws the weight of the shot alone.

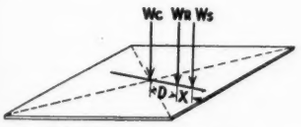
Measuring the distance X on the line connecting the balance point at the intersection of the diagonals, beyond the balance point locates the actual center of gravity on the shot alone. Transferring this point back to the map originally used locates the economic geographic center of distribution.

If no variations in rental values, insurance, traffic congestion, or city ordinances existed, no further study would be required. Unfortunately, such variations do always exist, and therefore make further study necessary in the practical solution of the problem. In the case under consideration, leases of original garages had some months to go before expiration, variations in auto insurance rates between widely separated individual garages existed, a central main office was maintained, and separate working forces existed in each garage. In the proposed central location, only one rental would be paid, the office would be located at this point, and a very appreciable force reduction would be effected. The final determination of the actual monetary savings required detailed analysis involving additions and deductions and giving consideration to all the factors previously mentioned with respect to the original several locations as well as to the single central location.

Aid to Locating Warehouse

In the case of the garages this method of determination has proved to be very effective. It is believed that it will be equally applicable to problems involving the distribution of food, drugs, beverages, furniture, hardware or any type of distribution requiring central warehousing. Instead of using the number of trucks actually dispatched each day to the various clients' plants, the number of trips to each outlet or district, or the tonnage handled to each outlet, or the number of pieces hauled to each outlet may be used to arrive at a proportionate figure for the same purpose. Then, by using these proportionate figures at the various outlet locations, in the same way as were used the number of trucks at the clients' locations, one can locate the most economic center of distribution. The method appears to be equally applicable to problems requiring solutions where territories larger than the city are involved.

PICTURE (left) was posed to illustrate the manner in which the "balance point" was determined. Each BB shot represents one rented truck and clumps of shot represent fleets of rented trucks. The entire area of the board represents the area served by the truck renting company.



Explanation

Wc is the weight of the corrugated board, concentrated at its center.

WR is the total weight of the shot and board, concentrated at the "balance point."

Ws is the weight of the shot alone, concentrated at the center of gravity of the shot-system.

D is the distance between the center of the board and the "balance point."

X is the distance beyond the "balance point" and in the line connecting the center of the board and the balance point, to the economic geographic center.

Are Your Floors Well Lubricated?

(Concluded from page 449)

place four times a day, and they use enough washing powder to balance their wages. Why, my mixing room looks like a janitor's school.

"Ah, I see!" taunted the friend. "So now you are making a specialty of janitors. Crowds of 'em. They are hired to scrub; scrub till it hurts. They are given a mop, a pail and a barrel of washing powder. They get hot water, put in a little powder, and smear it around. The water mixes with the flour dust and makes a nice slick soup. The powder emulsifies some of the oils and makes soap and glycerin; and there you are: a high-quality lubricant.

"The next step is to mop up; but do they ever stay with it until the floor is clean? Is the powder strong enough, even in the volume they use it, to make an emulsion of all the grease? Or does part of it spread out in a water-insoluble film when the clear rinsing water is applied?"

Tom forgot his meal. He was beginning to see the light.

"Why," he queried, "haven't we heard this wisdom before? Proceed, grim mentor."

"Well," replied the friend, with a twinkle in his eye, "I have told you almost all now; but I have a little more to add. Wet spots in a bakery mixing room are no disgrace, and it is practically impossible to avoid them; but slippery floors, whether wood or tile, are just as uncalled for as sanded ones, and even less sanitary. However, please bear this in mind when scrubbing: that grease or oil must be emulsified, or cut, before it can be handled satisfactorily in a water solution; and that no matter how strong your washing powder or detergent may be, you must always use enough to complete this transformation or the floor is still greasy when you get through. Also remember, the washing powder doesn't clean your floor; it is the mopping up you do after the powder is applied that calms your 'nightmare'."

How the *Vapor-Sealed Bake*

Cuts One-Third Off the

By G. R. FENNEMA
Baldwin, N. Y.

AS THERE is no clearer way of understanding any problem than by working out an example, let us work out two oven designs, one of an indirect-fired producer-gas oven with return-bend-type tubes placed crosswise with the oven, and another design with an electric heating system. In these designs we will have one type of heating system representing the cheapest, and another type representing the most expensive, although the most effective, method of heating.

Let us first discuss the type which typifies the cheapest method of heating. Fig. 1 represents an oven designed with an indirect-fired producer-gas heating system. To put the problem on a specific basis the following assumptions are made.

The oven is provided with 32 steel trays, 9 ft. long by 1 ft. 8 in. wide.

Oven-room temperature is 60 deg. F. minimum.

Oven temperature is 600 deg. F. maximum.

Temperature range is 540 deg. F. The temperature of the inner oven shell near the heating elements is considerably higher than the oven temperature; but, because there are other inner shell surfaces having a temperature considerably lower than the oven temperature, the heat losses will be calculated for a temperature range of 540 deg. F.

The inside surface area, with allowance for irregularities and to assure uniformity of performance, is 1,300 sq.ft.

The insulation consists of 8 in. of insulating block having a heat loss of 28.8 B.t.u. per square foot per hour at 540 deg. F. temperature range, $\left(\frac{540 \times 0.428}{8} = 28.8\right)$.

Steel bread pans and straps weigh 2,500 lb. and the mass is heated from 90 to 300 deg. F., a range of 210 deg. F.

Specific heat of steel is 0.12 B.t.u. per pound per deg. F.

The amount of steam used in this type of oven is not great and is assumed to be 103.5 lb. per 1000 lb. of bread baked.

The heat losses through the oven shell are 1,300x28.8, or approximately 37,500 B.t.u. per hour.

The heat required to raise the temperature of pans and straps from 90 to 300 deg. F. is 2500x210x0.12, or 63,000 B.t.u. per hour.

The heat required to bake 2,000 lb. bread with 6 per cent shrinkage in the oven, assuming 140 B.t.u. per pound, is 2,000x140, or 280,000, B.t.u. per hour.

The heat required to raise the temperature of the 207 lb. of steam injected into the oven from saturated steam at 212 deg. F. to superheated steam at 600 deg. F. is 207x388x0.46, or approximately 37,000, B.t.u. per hour.

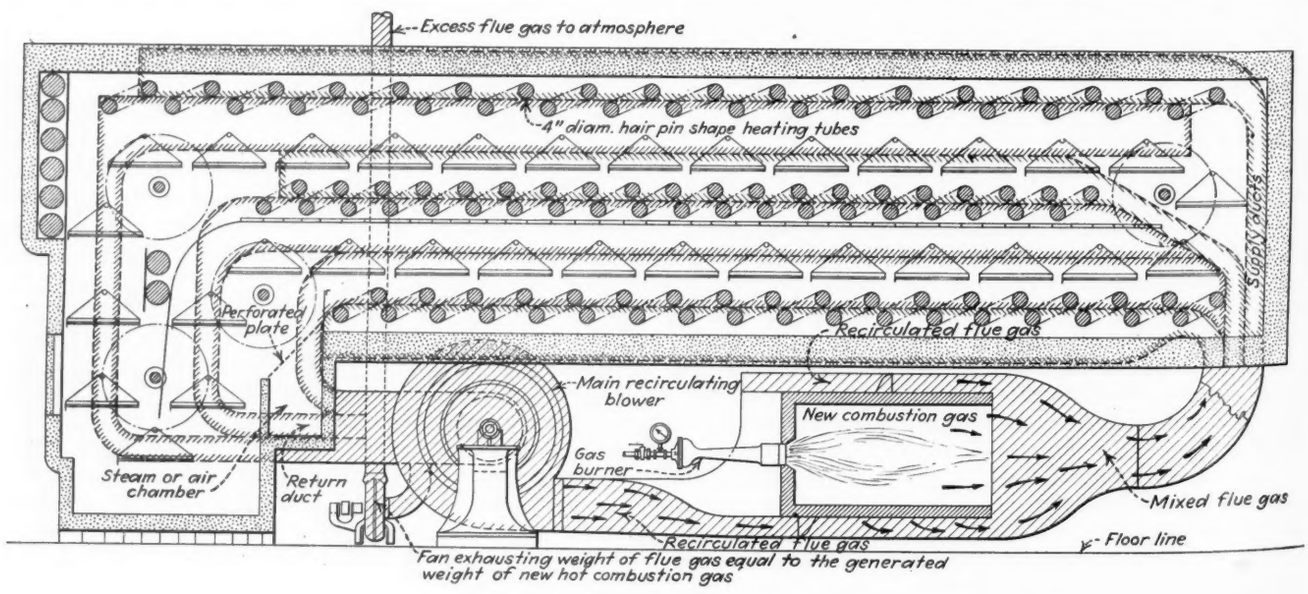
Summarizing the loads for continuous operation after the oven has been brought to baking temperature we have:

Radiation losses	= 37,500 B.t.u.
Heating bread pans	= 63,000 B.t.u.
Baking load with 6 per cent shrinkage	= 280,000 B.t.u.
Steam injected into oven	= 37,000 B.t.u.
	417,500 B.t.u. per hour

Reference to Fig. 1 will show that the oven has been divided into two zones in which the temperatures may be adjusted by varying the flow of gases through the hairpin-shaped heating tubes.

Steam is introduced into a large expansion chamber at a pressure below ¼ lb. per square inch and passes from this chamber into the oven through perforated top plates at a low velocity to avoid injector action and prevent disturbance of the oven atmosphere. The steam entering the oven is lighter than the partly saturated air in the dependent leg on the oven, so it will not escape through the steam-seal trap. As the steam travels along the path of the trays it becomes superheated and still lighter.

In bread baking, the superheated vapor is forced through the lower valve opening and run to a cooler and condenser operating under atmospheric pressure, where it is collected as condensate. In baking foodstuffs requiring a substantial drying effect, such as crackers, the vapor seal may be bypassed and a stack effect created. During this time, hot air


Excess flue gas to atmosphere
4" diam. hair pin shape heating tubes
Perforated plate
Recirculated flue gas
Main recirculating blower
New combustion gas
Gas burner
Steam or air chamber
Return duct
Mixed flue gas
Recirculated flue gas
Floor line
Fan exhausting weight of flue gas equal to the generated weight of new hot combustion gas

Oven Fuel Bill

• IN THIS ARTICLE and the next, which will be the concluding one of this series on bake ovens, is detailed the practical application of those design features of construction previously emphasized, FOOD INDUSTRIES, September, pp. 408-410.

• TO AVOID CONFUSION, this article deals wholly with the indirect-fired producer-gas system as the cheapest method of heating.

• THE CONCLUDING ARTICLE will discuss the details of an electric heating system and include a breakdown on costs of baking with a vapor-sealed oven as compared with those of ovens of more common construction. Bakers looking for ways of lowering their baking costs will be particularly interested in this concluding article.

may be injected into the oven through the steam-expansion chamber. In this way the amount of air of infiltration may be controlled and practically any desired oven atmosphere maintained.

The question has been raised as to whether the moving shelves in a tray oven create a certain disturbance of the vapors in the baking chamber. The speed of the shelves is approximately 2 ft. per minute in the continuous trays and about 4 ft. per minute in the stopping and starting trays. The pressure created by this movement is very small, as the following figures show:

$V = 4800\ \sqrt{h}$ or in the oven under discussion

$4 = 4800\ \sqrt{h}$

$h = \left(\frac{4}{4800}\right)^2 = 0.000{,}000{,}695$ in. of water

V = Velocity at which the pans move in feet per minute
4800 = Velocity constant of air at 300 deg F. under
h pressure head in terms of inches of water.

Furthermore, this pressure can be created only if the shelves act as tight-fitting pistons.

The only amount of air of infiltration which can enter this oven is that amount which is present inside the bread pans not entirely filled with dough. Unfortunately, the entrance of this small amount of air is unavoidable and, together with other non-condensable gases, is troublesome in the condensing unit, if such be a part of the oven system.

The heating system for this oven should be of the recirculating type of inclosed system. Fuller understanding of the reason for selecting the recirculating type of system is reached when the combustion temperature and other necessary points are computed.

Producer gas has the following average composition by volume:

Carbon dioxide	CO_2 =	7.5 per cent
Oxygen	O_2 =	0 per cent
Carbon monoxide	CO =	26.5 per cent
Nitrogen	N_2 =	59.4 per cent
Methane	CH_4 =	0.5 per cent
Hydrogen	H_2 =	6.1 per cent
		100.0 per cent

The gas has a weight of 0.069,041 lb. per cubic foot, and a volume of 14.5 cu.ft. per pound at 32 deg. F.

The heating value of the gas, calculated from the above analysis, is approximately 1720 B.t.u. per pound of gas; 118 B.t.u. per cubic foot of gas at 32 deg. F.

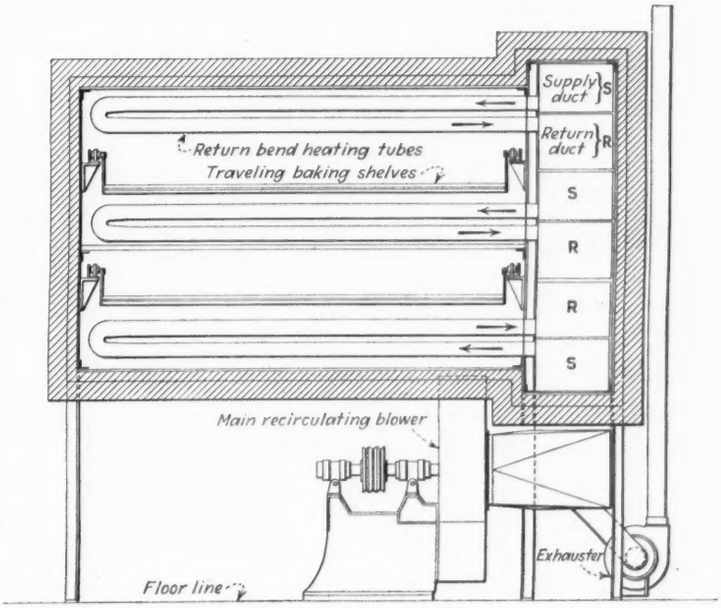
The theoretical quantity of air required for the combustion of the gas is 1.1782 lb. of air per pound of gas. The flue gas has a weight of 2.1782 per pound of producer gas consumed, and a specific heat of 0.2375; therefore, the ideal combustion temperature is $\frac{1720}{2.1782 \times 0.2375}$ or 3,340 deg. F.

Assuming about 66 per cent of excess air for proper combustion, the actual combustion temperature is 0.5129 B.t.u. per deg. F. rise in temperature for minimum air supply + 0.82 × 0.2375, or 0.1930 B.t.u. per deg. F. rise in temperature for the 66 per cent excess air. The total is 0.7059 B.t.u. per deg. F. rise in temperature. The actual combustion temperature is $\frac{1720}{0.7059}$, or 2,440 deg. F.

From these calculations it is obvious that it is impossible to maintain uniform temperatures throughout a heating system merely by cir-

¶ LEFT . . . IN THIS OVEN DESIGN the vapor-seal level is reduced to the minimum to illustrate the limit to which one can go and yet have an effective vapor seal. Greater saving in floor space can be had by building the oven higher, thus increasing the vapor-seal depth and making the floor space under the greater portion of the baking chamber available for storage or for proof-boxes. The higher-built designs are not so desirable when combustion chambers, blowers and vapor ducts are essential parts of the heating system and can be built into the oven under the baking chamber.

¶ RIGHT . . . CROSS SECTION through the oil- or gas-fired, vapor-sealed oven illustrating the construction of the return bend heating tubes in relation to the recirculating fan and duct system. Important factors in the construction of the vapor-sealed oven are the relatively high heating surface area and low temperature of the stack gases.



culating this high-temperature flue gas. To obtain a circulating medium of low temperature which will produce uniform temperatures in the heating system it will be necessary to recirculate a large part of the flue gases and mix it with the high-temperature products of combustion.

The quantity of flue gas which must be recirculated may be calculated as follows:

Assume a stack temperature of 660 deg. F., a mixed flue gas temperature of 760 deg. F., which gives a temperature range of 100 deg. F., an oven temperature of 600 deg. F., and combustion temperature of 2,440 deg. F., using 66 per cent excess air.

An oven temperature of 600 deg. F. is rather high, but bakers are specifying that maximum heat range when buying new ovens.

For every pound of producer gas burned 2 lb. of air is used to give 3 lb. of flue gas at a temperature of 2,440 deg. F. As the specific heat of the flue gases is assumed to be approximately uniform at all temperatures in question, that factor is omitted in the following equation:

$$3 \times 2440 + X \times 660 = 760\ (3 + X)$$
$$100\,X = 5040$$
$$X = 50.4$$

Thus for every pound of producer gas burned we add 2 lb. of air for combustion and recirculate 50.4 lb. of flue gas to lower the combustion temperature from 2,440 deg. F. to 760 deg. F.

Quantity of flue gas to be circulated through the heating system per hour to bake 2,000 lb. bread is $\frac{417{,}500}{100 \times 0.2375}$, or 17,600 lb. per hour; 293 lb. of flue gas per minute, or $293 \times 28 = 8{,}200$ cu.ft. of flue gas recirculated per minute.

In order to determine the amount of heating surface required, the following computations must be made:

The log mean temperature difference between the flue-gas temperature is found as follows:

The log mean temperature difference

$$\Delta t = \frac{\Delta t_1 - \Delta t_2}{\log_e \frac{\Delta t_1}{\Delta t_2}}$$

in which t_1 = difference between entering flue-gas temperature and oven temperature

t_2 = difference between leaving flue-gas temperature and oven temperature

$$t = \frac{160 - 60}{\log_e \frac{160}{60}} = \frac{100}{0.9821} = 102 \text{ deg. F.}$$

The radiating capacity of the heating system in B.t.u. per square foot degree per hour is found as follows:

$$h_r = \frac{C\left(\frac{(T_1)^4}{100} - \frac{(T_2)^4}{100}\right)}{\Delta t}$$

in which T_1 = mean temperature of radiating surface; 1,162 deg. F. absolute (102 + 600 + 460).

T_2 = oven temperature; 1,060 deg. F. absolute (600 + 460)

$$\text{Therefore } h_r = \frac{0.105\,\frac{(1162)^4}{100} - \frac{(1060)^4}{100}}{102}$$

$$= \frac{0.105 \times 5.500}{102} = 5.71$$

B.t.u. per square feet per hour per deg. F., the heat of radiation, which in this case is expressed in square feet heating surface per deg. F.

The quantity of heat transmitted to the heating system by the flue gases traveling at fairly high velocity is the sum of the heat radiated by the gases to the system plus the heat of convection between the gases and the heating system, $h = h_r + h_c$.

This quantity may be calculated in the following empirical equation:

$h = \frac{0.32 \times V^{4/5}*}{\sqrt[4]{D}}$, in which D is the diameter of the flue pipes, taken as 0.332 ft., and V = the velocity of the flue gases in heating tubes, taken as 30 ft. per second.

$$h = \frac{0.32 \times 30^{4/5}}{\sqrt[4]{0.322}} = \frac{0.32 \times 15.175}{0.755}$$

= 6.43 B.t.u. per square foot per hour per deg. F

In selecting the heating surface it must be remembered that the radiating effect of horizontal cylindrical pipe surfaces is only about 66 per cent effective. This effect reduces the value of 5.7 B.t.u. per square foot per deg. F. to 3.77 B.t.u. per square foot per hour per deg. F.

The heating surface of the tubes used in this oven is 19.5 sq.ft. each.

The number of heating tubes necessary to supply the required quantity of heat in the oven is found as follows: $\frac{1085}{19.5} = 56$ tubes, which is the number shown in the drawing, each having a cross-section area of 10.44 sq.in.

A check on the velocity of the flue gases in the tubes is made as follows:

$$V = \frac{8{,}200}{\frac{56 \times 10.44}{144}} = \frac{8{,}200}{4.06} = 2{,}020 \text{ ft. per minute}$$

which is 33.6, or close to 30 ft. per second, which was assumed.

It will be noted that, in selecting the heating surface, the smaller item of radiation per square foot of heating surface was used in place of the larger item of heat transmitted to the heating surface by the flue gases, which in this case amounts to 6.43 B.t.u. per square foot per hour per deg. F.

However, under certain conditions of low flue-gas velocities and large-diameter flues, the flue-gas transmission coefficient may be lower than the radiation coefficient, in which case the selection of the heating surface would be based on the first coefficient.

We may now determine the over-all efficiencies of the heating system and oven.

The fan for recirculating the flue gas must handle 50.4 lb. of flue gas for every pound of producer gas burned.

The calorific value of the producer gas is 1,720 B.t.u. per pound.

The heat absorbed by the heating system is 1,265 B.t.u. per pound of producer gas burned ($53.4 \times 100 \times 0.2375$).

The number of pounds of producer gas burned is:

$\frac{417{,}500}{1265}$, or 330 lb. per hour

or $330 \times 14.7 = 4{,}780$ cu.ft. per hour at 32 deg. F.

From this figure we see that the gas consumption is $\frac{4780}{2}$, or 2,390 cu.ft. per 1,000 lb. of product baked, which is possible only in a perfect vapor-seal bake oven.

The over-all efficiency of the heating system is

$\frac{1265}{1750} \times 100 = 73.5$ per cent.

The fuel efficiency of the oven, as was proposed in an earlier article in this series, is $\frac{280{,}000}{330 \times 1720} \times 100 =$ 49.5 per cent.

The recirculating fan must handle $\frac{330 \times 50.4}{60}$, or 277 lb. of flue gas per minute at a temperature of 660 deg. F.

The volume of this flue gas at 660 deg. F. is 277×28, or 7,750 cu.ft. per minute. This is equivalent to $\frac{7750}{1.452}$, or 5,330 cu.ft. per minute at standard conditions of 70 deg. F.

A No. 9 A.B.C. pressure blower and exhauster has the required capacity for this recirculation system. At standard temperature of 70 deg. F. the fan requires about 4 hp. at 600 r.p.m. delivering the gas against 2 in. static pressure. Operating at 660 deg. F. the fan requires 1.452×4, or about 6, hp. at a speed of $1.452 \times 600 = 870$ r.p.m. to deliver the flue gas against a 2-in. static pressure.

The burner suitable for the heating system must have a capacity of 80 cu.ft. per minute. A 4-in. burner with a proper speed, operated under sufficient gas pressure, should prove to be suitable for this system.

*"Industrial Heat Transfer," by Schack, Goldschmidt and Partridge. John Wiley & Sons, 1933.

Booster Refrigeration

Put on Trial by Packers

Effect of Carbon Dioxide on Shipments of Meat Scrutinized in Practice

By HALDANE GEE
New York, N. Y.

Charging a refrigerator car with "booster" refrigerant, a cake of solid CO_2 contained in a shipping case. At the right, the solid CO_2 may be seen hanging from the ceiling of the car, supported by a heavy cord.

OCCASIONAL consignments of meat have been handled by rail in recent months under "booster refrigeration." This term is one which has been gaining circulation in meat circles for two or three years. "Boosting" usually means the use of solid CO_2 as an accessory refrigerant for meat shipments. The practice involves the placing of solid CO_2 inside the cars in such a manner that carbon dioxide gas may come in contact with the goods, a condition for which benefits are claimed. The development is receiving support in some quarters as a definite advance in meat handling, and several of the large packers are giving it serious attention.

Three factors appear to contribute to current interest in boosting. One is the constant growth of the solid CO_2 business, bringing both improved distribution facilities and a steady reduction in contract prices. A general incentive has been successful large-scale shipments of chilled beef from Australia to Great Britain, regarded by some as revolutionary and involving the use of carbon dioxide in the ship's holds. Thirdly, there were involuntary experiments in the field during the past summer, when abnormally high temperatures necessitated the use of extra or emergency chilling in regular water-ice cars. The activity is resulting in more extensive use of solid CO_2 in meat-packing and cutting establishments, although as yet there is no general agreement as to such supplementary benefits as may be derived from the release of the carbon dioxide gas in conjunction with the chilling action of the solid CO_2 itself.

Scrutiny of reports on the ocean shipments of chilled beef reveals that unwarranted credit has been given to carbon dioxide for the success of some of these consignments. The "gassing" of the refrigerator holds undoubtedly was inspired by the recognized use of carbon dioxide for restraining ripening of fruits on long voyages. Conservative opinion would have been against arbitrary adoption by the meat trade of measures successful for fruits and vegetables.

New Zealand chilled beef first attracted attention in the English market when 520 hindquarters arrived in July, 1933, a load which had been given carbon-dioxide treatment. Subsequently, more than 8,000 quarters have been shipped under various conditions from Australia and New Zealand, and the meat has been described on arrival in Great Britian as in "good to excellent condition."

Carbonation was not emphasized after the first shipments, however. The trial consignment of 520 quarters did receive 10 per cent of carbon dioxide gas in the refrigerator compartments. But the gas had leaked away entirely on the 25th day of the 37-day voyage, after which, it is stated, "temperature alone kept the beef in splendid condition." It was retailed "in excellent bloom and entirely free from molds."

Another consignment of 13,000 quarters arrived in February, 1934. Only a fraction of the cargo received carbon dioxide this time. It sold at approximately the same price as Argentine beef of comparable quality, which previously had dominated the market. No distinction was recorded between the carbonated and air-stored meat. General comment was that the beef "displayed splendid conformation and bloom . . . a very negligible quantity of white mold . . . black mold was conspicuous by its absence." Ocean transit in this case took 35 days, with an interval of 37 days between slaughtering and sale.

In March, 1934, another consignment of 2,050 quarters arrived after a 35-day trip in "excellent condition," and it was sold advantageously. There

is no record of carbonation of this third lot, of which it was said that "the speeding up of the journey had effected extraordinarily good results." New Zealand cargoes formerly required 40 to 45 days for the same trip.

Impartial appraisal of these shipments indicates that they were unique in the express handling they received, rather than in attempted carbonation. The competing Argentine beef usually is sold 28 to 30 days after killing. It is nevertheless admitted that restraint of mold growth, where there was occasion for comment, may have been due in part to the use of carbon dioxide.

One of the consignees involved in this development was content with the single shipment. At the instigation of another, however, a steamship company is equipping one of its new vessels with a metal-lined, gas-tight compartment for chilled meat. The Australasian experience will be watched, although the business may be interrupted at any time by price reductions in the Argentine or by government subsidy of domestic meat producers in Great Britain.

Difficulty of maintaining rigidly controlled conditions in these freight-boat shipments is again encountered in the current applications of solid CO_2 to refrigerator-car service on this continent, where at least two methods have been tried. One system calls for the addition of a few cakes of solid CO_2 to the regular refrigerant, with the carbon dioxide added on top of a reduced water-ice load in the conventional bunkers. This technique does not appear to have been widely used, and reports on it are not available. The other system requires the placing of solid CO_2 in sacks or baskets inside the car along with the load, which may vary from sides to mixed meats.

In addition to its emergency use to maintain cold in extremely hot weather, boosting has been advocated also for the purpose of eliminating sidetracking of cars for re-icing on trips of moderate length. The effect on meat products is said to be both restraint of bacterial attack and the preservation of the bloom on "white" meats such as pork.

The present status of boosting is revealed in reports of actual procedures employed by large packers and their comment on the results. Boosting in one or other of its forms appears to have been pioneered by the Cleveland Provision Co. The present policy of this company is to use solid CO_2 when car shipments are to be made on days when the temperature is near 100 deg. The cars receive the regular load of water-ice in the bunkers. Then 100 to 150 lb. of solid CO_2 is placed inside along with the meat. The refrigerant is hung in baskets from the ceiling, with one basket at each end and a third (when needed) in the center of the car. When it is not possible to avoid the simultaneous shipment of fresh and smoked meats, the solid CO_2 is placed near the fresh meat.

Officials of Cleveland Provision Co. state that the bloom is preserved on pork and that bacterial growth appears to be restrained. Records of car temperatures have not been attempted, but the management attributes benefit to the low temperatures and not to the presence of carbon dioxide gas. The same company has nursed incoming cars along when they arrived at night with the usual water-ice at the point of exhaustion. When the watchman finds boxed meat shipments arriving on the danger line of temperature, he arranges for baskets of solid CO_2 to be hung inside the cars immediately. The workmen crawl over the tops of the boxes to hang the solid CO_2 close to the roof at the ends and center of the car. Cars filled with sides of beef or pork cannot be so treated. In this case, the baskets or refrigerant are placed at the door opening only.

Cleveland Provision Co. has used boosting for somewhat more than four years, appraising it as advantageous. Earlier attempts of the company to use solid CO_2 as the sole refrigerant were abandoned in favor of the boosting procedure where the solid CO_2 supplements the water ice.

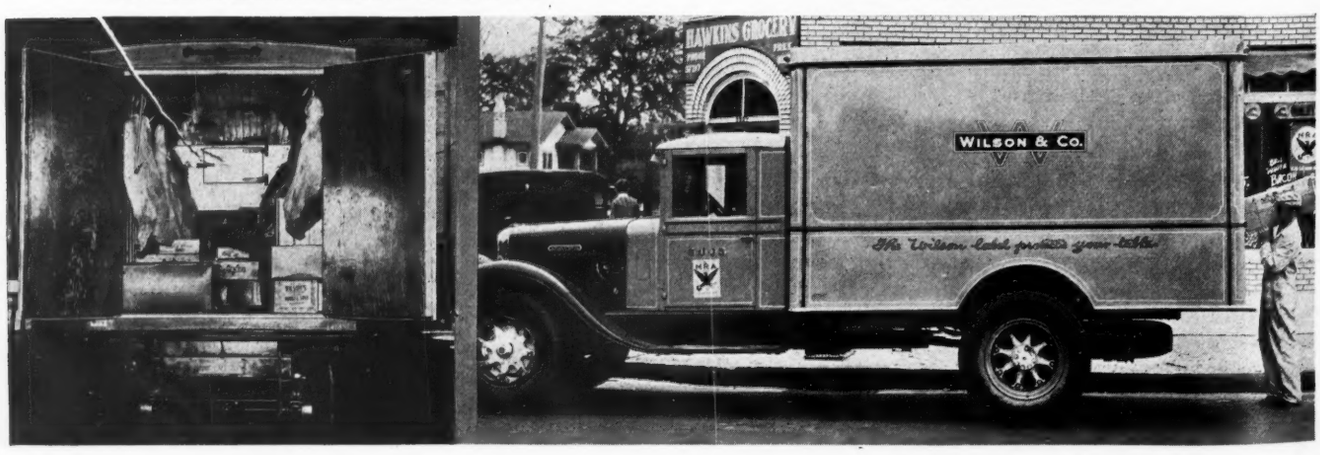
Cudahy Brothers employ boosting in the summer months. Their procedure is to use two or three 50-lb. cakes of solid CO_2 in bags hung from the ceiling in the center of the car. Only cars of mixed fresh meat are so treated, officials reporting that "this carries the product to its destination very satisfactorily." The average trip length of the Cudahy cars is three days. Boosting obviates the need for re-icing on such a trip except in abnormally hot weather. This company's experience has resulted in a regular summer boosting program, although the benefits have not been precisely evaluated.

Two large Chicago packers reserve comment on the development considering that their experiments thus far do not justify a final opinion. One company reports that its engineering and operating departments have not re-

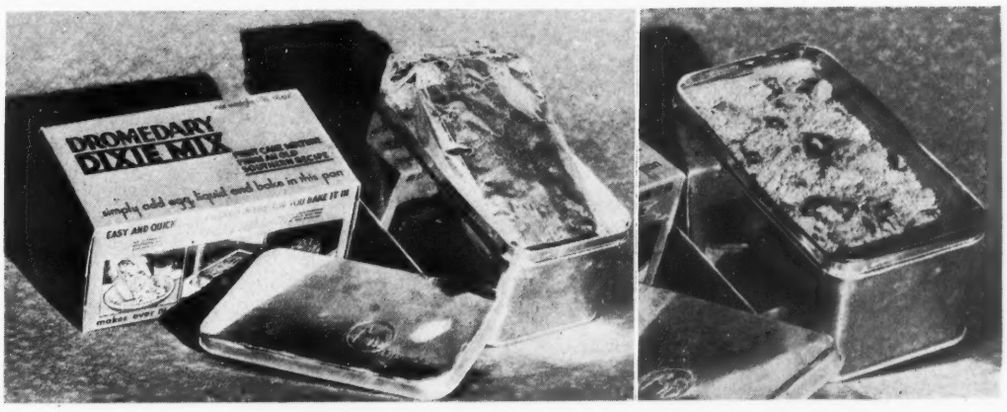
(Turn to page 459)

Solid CO_2 has proved a satisfactory refrigerant for highway freight. One national chain store has adopted the type of truck pictured here, with gratifying results. Solid CO_2 compartment is shown at front of body.

Wilson & Co. uses trucks refrigerated with solid CO_2 in its Jacksonville (Fla.) territory. This truck delivers meat to points as far as 250 miles south of Jacksonville and makes the trip without re-icing.



Why The Hills Bros. Co. Is Using



On the right is a filled and uncovered "Dixie Mix" container before glassine-backed aluminum foil bags were used as inner packages, as shown on the left.

Foil to Protect Packaged Food

From Storage Pests

By using a foil inner bag in its Dromedary "Dixie Mix" package this company prevents sifting and subsequent insect infestation. Reduced losses and increased sales become clear gain, as savings in labor and packaging materials cost equalize expense of foil inner bag.

PREVENTION of insect infestation is not generally given as one of the arguments for packaging a product in foil. Yet that is the reason for the adoption of a glassine-backed aluminum foil bag by The Hills Bros. Co. for its "Dixie Mix" fruit-cake mixture.

When this company began the manufacture of this prepared mix in its Brooklyn plant two years ago this autumn, it took a short cut to the solution of many of the problems that bedevil the life of the manufacturer of packaged prepared mixes. Either by accident or by design—it matters not which—deterioration of the shortening by action of penetrating light, absorption of the shortening by the package, and effect of atmospheric conditions upon the moisture content of the mix were reduced to the minimum by the adoption of a bright, heavily tinned slip-covered container. The one criticism of this container was that in an effort to get as tightly closed a container as possible the lid fitted so tightly on the ends that there was a slight buckling on the long dimension which caused a narrow opening between the sides of the lid and the container body.

This container, so aptly chosen that it fostered the advertising slogan "Packed in the tin you bake it in," was, and is, innerlined with a carefully fitted waxed-glassine paper to save the housewife the inconvenience of greasing or cutting a waxed-paper liner for the tin before using as a baking pan. The container also gave assurance that there would be no material loss or damage to the ingredient contents although the package might be handled so roughly that the outer cardboard carton would be damaged or destroyed, the carton might become damp, or rodents might cut through the shipping container.

Get almost any manufacturer of a new food product to talking and he'll soon admit that he has a host of troubles and that they are not always small ones. He'll also very likely confess that no matter how many of these troubles he anticipates and forearms himself against, there will be one or more which have to be faced after the blare of trumpets and reams of sales promotion literature have helped the enthusiastic sales force put over the new product to the retailer and his customers.

In the case of the Dromedary "Dixie Mix" fruit-cake package, the manufacturers became apprehensive that the dealers would refuse to put or even keep it on their shelves during warm weather and in the warmer climates. They were afraid of it. "It will become wormy," they said. No one wanted to take a chance on it as a year-round item. This in spite of a growing consumer demand during the holiday season.

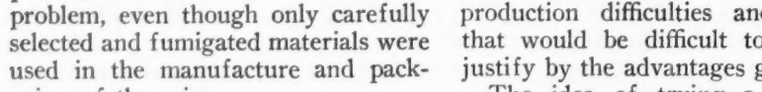
The reason for this apprehension was not difficult to understand when unsold packages were returned to the factory. As the metal container was intended to serve as a baking pan and container for the 1¼-lb. finished cake, it had to be somewhat larger than was necessary to contain a net weight of 1 lb. 1½ oz. of dry ingredients. This oversize space gave the ingredients an opportunity to shift about during the handling of the package and caused a sifting out of the more finely divided materials. An attempt was made to stop this sifting by snapping a fitted false cover into the container above the ingredient contents to serve as an inner seal for the container.

This device reduced but did not stop the sifting. As long as this sifting continued, the plant management felt it would be in for trouble. It recognized in this mixture of flour, sugar, shortening, nuts, candied fruits, spices and leavening agent a happy feeding and breeding ground for weevils, moths, ants and other insects that thrive on such ingredient foods.

An additional precaution of wrapping the outside of the entire package with moisture-resisting transparent wrappings, did not constitute a 100 per cent solution of the vexatious problem, even though only carefully selected and fumigated materials were used in the manufacture and packaging of the mix.

Adoption of a metal container for vacuum packing, inert gas packing, or friction top closing would mean giving up the "packed-in-the-tin-you-bake-it-in" feature of the original package which is covered by patent, and, furthermore, would involve production difficulties and expense that would be difficult to offset or justify by the advantages gained.

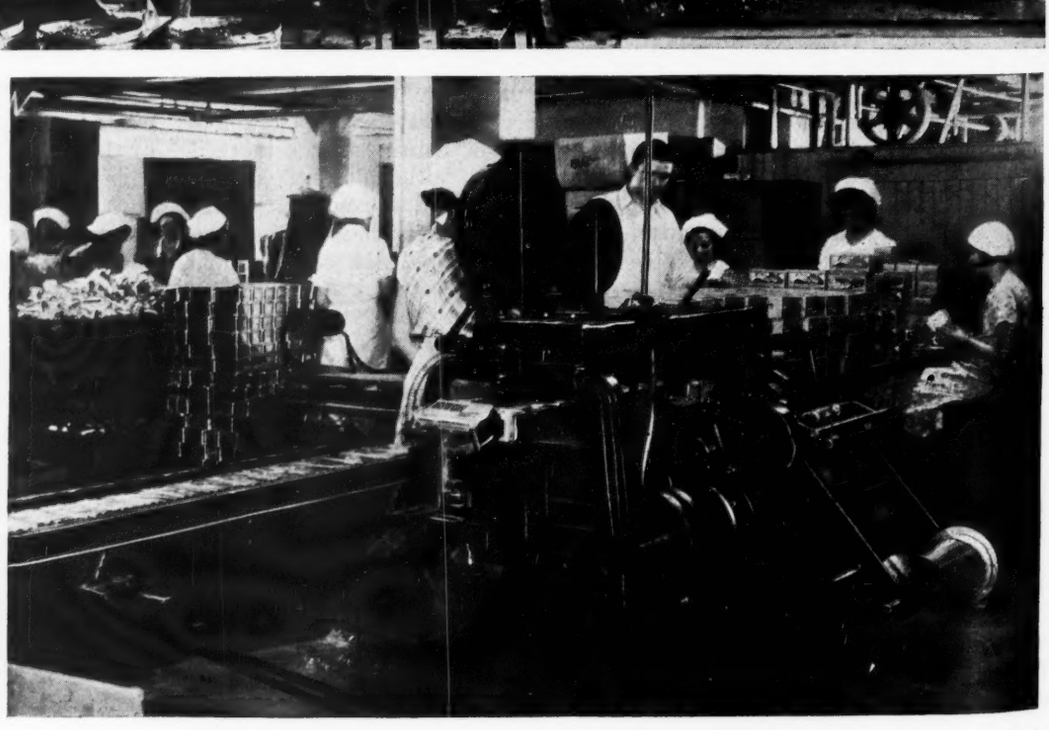
The idea of trying a metal-foil inner container for the mixture was not the result of snap judgment. For a year or more, the California Fruit & Apricot Grower's Association had been packing its dried prunes in paper-backed foil, and the merchandising results had been so satisfactory that the foil package was later adopted for apricots as well. Packers of cheese, shredded coconut in bulk, tobacco and similar products susceptible to insect infestation as well as to drying out and staling had long used foil packaging to prolong the salability or shelf-life of their products. The Hills Bros. Co. itself had several months previously made tests on its glacéd citron, orange and lemon peel, and later on its "Dixie Mix" fruit cake to determine the best method of packaging to get longer shelf-life for its products.



Automatic weighing of Dromedary "Dixie Mix" is not yet feasible, as the fruits and nuts tend to separate from other ingredients. Correct ratio of fruit and nut mixture is assured by being weighed separate and placed in filling scoop containing correct quantity of flour, sugar, shortening, spices and leavening mixture.

The fruits and nuts are cut to desired fineness and mixed with enough flour to keep them from forming aggregates. In the background is a J. H. Day "Cut-it-In" mixer in which the flour, sugar, shortening, spices and leavening are compounded.

◆



Before foil-bag inner containers were adopted the cans containing "Dixie Mix" were carried by canvas conveyor before girls who lidded the cans, put them into cardboard cartons, and wrapped the packages with moisture-resistant transparent wrappings. Adoption of foil bags eliminates external wrapping of package.

The results of these tests were consistent in that all these products retained their salability best when packaged in paper-backed foil. When the foil was used as an outer tight wrapper it made a beautiful appearing package and helped to a great extent to retain more completely the freshness and salability of the products than did other wrapping materials. Yet there remained the sifting action inside the package, which doubtless would be objectionable in the minds of the housewives. But the chief drawback was the uncertainty that a tight outside wrapper would solve the shelf-life problem sufficiently to justify the capital investment of a few thousand dollars in a tight-wrapping machine at this time.

When the foil was used as an inner package in bag form with a double-fold closure, all sifting was eliminated and the other desirable features of the foil packaging, particularly moisture retention and retarded "breathing" of the leavening, were retained with the exception of the external appearance of the package, which, after all, was not a part of the problem to be solved. These packages of foil-packed "Dixie Mix" subjected to conditions resulting in insect infestation of control packages were found to be free from insect contamination at the end of the test. Glassine inner bags failed to give the same protection because they were more susceptible to cracking or splitting during filling and subsequent handling.

Even the glassine-backed foil bags are not foolproof, but the defects are more a criticism of the making of the bag than of the material from which the bag is made. Satchel-bottom bags having three creases up each side when flat and empty have an inherent weakness that is not so likely in the flat bag with a straight, plain bottom and a single crease up each side. In the flat bag there is less likelihood of splits or punctures along the creases and in the bottom folds during the filling operations. Also in the satchel-bottom style of bag there is more chance of the foil surfaces coming together with an imperfect seal; due to the inability of commonly used adhesives to seal one metal surface to another metal surface. In the straight-bottom bag the seal is made more uniformly between foil and the glassine paper. Again there is a possibility of particles of the mix getting into the external bottom folds of the satchel-bottom bag and attracting insects. However, this attraction is not as great as in the sifting of particles of the mixture into the outside cardboard carton of the original package.

Another defect in the foil bags that must be watched for is the presence of small pinholes extending through both the foil and glassine. These holes are not common and are not so likely to occur when the bags are supplied by experienced bag makers.

Even though the foil inner bag is a relatively expensive addition to the packaging of "Dixie Mix," the net cost is not increased. By adopting the inner-bag method of packing, the makeshift false top or inner seal is eliminated, as is the moisture-resisting transparent outer wrapping. Elimination of the material cost of these two items plus the machine and labor cost incidental to their use offset the cost of the foil bags and the slight increase in labor costs of filling, closing and putting the bag into the metal container over the labor cost of the single operation of filling directly into the glassine-lined metal container.

While this presentation is in the nature of a case history of the difficulties experienced by The Hills Bros. Co. in connection with the packaging and merchandising of one of its product, the experiences of many other manufacturers of new packaged foods differ only in details specific to the package and the product. And not always does the manufacturer face his problems in a persevering manner and turn every stone that might uncover a solution to his problem.

Booster Refrigeration on Trial by Packers

(Concluded from page 456)

turned a verdict up to the present, although the investigation is being continued. The company does not consider that boosting should be placed in general operation as yet. Its procedures have varied widely in different trials, with one specially staged car shipment turning out disappointingly. Research officers of the organization conclude that "while carbon dioxide is helpful on long boat shipments—for instance, from Australia to England—it is of no special benefit on a comparatively short rail shipment."

The second well-known Chicago concern has limited experiments to a few tests, placing the solid CO_2 in the center of the car, where the bunker cold is least effective and where door leaks are likely to be encountered. Solid CO_2 has been used in quantities of 100 lb. in shipments of mixed packing-house products in regular cars from the Mid-West to the East. The tests to date are summarized as neither conclusive nor convincing.

Another phase of boosting is the use of solid CO_2 in refrigerator trucks. One distributor to take an example, sends out trucks containing 5,000 lb. of meat on a run of 66 miles with 50 lb. of solid CO_2 as the sole refrigerant, a service reported as operating satisfactorily. It is likely that trucks refrigerated with solid CO_2 will become popular faster than will all solid CO_2 rail cars. Truck operators will do well to inquire whether, on the one hand, the advantages claimed for boosting are utilized in such shipments, or whether, on the other hand, possible unfavorable effects enter. Subsequent experience will decide whether free circulation of carbon dioxide gas through the truck lading is to be encouraged or discarded.

The random nature of current trials is evident from this survey of the new field. Railroad shipments in particular are complicated by the difficulty of controlling gas concentration and by the differing states of repair of cars. Open seams and leaky doors are common factors vitiating rigorous experiment.

It would seem that the entire situation could be clarified by extensive small-scale laboratory runs on meat of known past history, and covering a range of gas concentrations, temperatures, humidities and storage times. Among possible beneficial effects of carbonation are the restraint of mold invasion and changes in tissue pH which may be a physico-chemical advantage but which are not yet sufficiently understood. Experience dictates, however, that attempts to elevate storage temperatures must be viewed with caution. Carbonation has not yet been proved to take the place of proper refrigeration, although proper refrigeration certainly can be secured with solid CO_2. It can be stated once again that the proved and accepted uses of carbon dioxide gas for food preservation are both limited and circumscribed.

Flies! Gnats!! Ants!!!

Winged adult termites retain their wings but a short time after swarming in search for a new habitat. Their presence is a first-hand warning to search out the colony of workers and soldiers which is doing destructive work somewhere in the wooden parts of the plant.

¶ There is no substitute for good housekeeping and plant sanitation in keeping a food plant free from such insect pests. Fumigants, sprays, poisons, traps, and similar weapons are makeshifts to get rid of pests after they have gotten a foothold.

By **HARRY STINER**
Los Angeles, Calif.

FLIES in several different forms are likely to be found around any food plant. For the purpose of their control they may be grouped roughly as: (1) ordinary flies, which include such types as the "blow," house, stable, and sand flies; (2) the pomace flies (vinegar gnats); (3) the cheese flies (skippers).

"Blow" flies and house flies, and, even the stable flies—near cousins to the "blow" and "house" species and with the stinging bite—not only include a multitude of varieties but need no description either in looks or habits for the average persons. The sand flies, included in this group, are tiny, gnatlike creatures with hairy bodies, are brown or dark colored, and somewhat resemble small moths. In food plants they are most frequently encountered at night or in subdued light around neglected sinks, sewers and cesspools, in which they breed and furnish telling evidence of the unsanitary condition that obtains.

Pomace flies (vinegar gnats) also are small gnatlike insects. The one most frequently encountered in food plants is less than $\frac{1}{8}$ in. long, of a light brown or orange-yellow color, and fairly active. The larvae (maggots) are dusky white and about $\frac{1}{4}$ in. long. Pomace flies prefer decaying and fermenting fruits and similar materials for breeding places, but may be found in many forms of decaying vegetable and animal matter. Such materials as vinegar, jellies, molasses, pickles and fermenting fruits will attract the adults in large numbers.

Cheese flies (skippers) are about $\frac{1}{8}$ in. long, of a dark bronze or bluish color, with yellow face and antennae. The larvae (maggots) are about $\frac{1}{3}\frac{1}{2}$ in. long and of a white to grayish color. The maggots have a way of doubling up, then jumping, which gave rise to the common name "skipper."

The cheese skipper is considered a scavenger, perhaps because it is found only in the decayed, liquid parts of food materials, such as ham, bacon, oleomargarine, and cheese; however, such occurrence does not alter the fact that they are pests and that when they are in the presence of other foods they should be destroyed rather than be permitted to contaminate further such materials as might be salvaged.

Control methods for flies of all kinds may be largely summed up in one word: "sanitation." Screens may be placed on all windows and doors, thereby excluding most of the ever-waiting horde from outside. Traps, poisons and insecticides may be used until they are the chief attraction in the plant, and even wholesale fumigation may be carried on regularly, but when all is done and the curtain is drawn on another day there will still be flies if the plant is not sanitary. Dirty sinks, cesspools, sewers, wet floors, soiled containers, decaying or fermenting foodstuffs, all furnish continued attractions for these pests as long as they exist.

Temporary control of ordinary flies in a food plant usually is obtained by the use of a good fly spray (formula No. 5)[1]. Poisons and traps are not only unsightly but usually are in the way. General fumigation is not satisfactory because of its expense. Screens keep out many flies and other pests besides adding to the general character of the plant; however, when screens are not properly arranged and cared for they will often act more as traps by preventing many of the pests from escaping.

Temporary control of pomace flies may be had in much the same manner as for ordinary flies; in addition, uncleanable cesspools, sewers and wet spots may be sprayed with a mixture of 40 per cent formalin and water (1:3), sprinkled with chloride of lime, or dusted with sodium fluoride powder.

Aside from sanitation the activities of cheese flies require a different form of control. Fumigation is effective

when the material and room temperature is above 50 deg. F. However, as most of the foods these insects attack are of an oily nature, a gas, such as cyanide or ethylene oxide mixture[1], should be selected that will not affect oil. In rooms betwen 35 and 50 deg. F. the fumigant sprays will often act as good repellents, in addition to destroying a large number of the insects. Below 35 deg. F. the insects are inactive but will live through a temperature of 32 deg. F. for three months and be able to take up their life work promptly when again warmed up.

Storage mites are small, microscopic spiders, and they have eight legs instead of six, as have insects. They usually are somewhat pear-shaped, colorless, hairy and, for the most part, slow and awkward. In common parlance they are known as cheese, grain, dried-fruit, cereal, and flour mites, which terminology to a degree indicates the food each species prefers. For general control work, however, the particular type of mite encountered should cause but little concern, as their habits, results of their attacks and methods used to control them are essentially the same.

[1]Food Industries, Vol. 6, p. 160 (April, 1934).

What with the mite's small size and its powers of rapid reproduction, infestations of what seem to the naked eye to be merely layers of still brown dust will often appear under a lens to be an animated conglomerate of bubbles, legs, moulted skins and particles of food—100,000 to the square inch, and each separate particle struggling desperately to reach the top of the pile.

Although mites are small and comparatively slow, they will often display remarkable ability at distributing themselves among other food products. The floor surrounding any infested material usually will contain many of the pests. If other foods are even temporarily placed near, they are almost certain to become infested. Floors and walls of masonry where food refuse may collect are favorite breeding places for mites, often accumulating in recesses in large numbers. In all such places, or wherever foods will not be contacted, the roach spray (formula No. 1)[2] will be found fully sufficient for control. Infested materials may be treated with heat or fumigated, but the type of treatment should be determined by the food, as mites are easily destroyed by either method.[1]

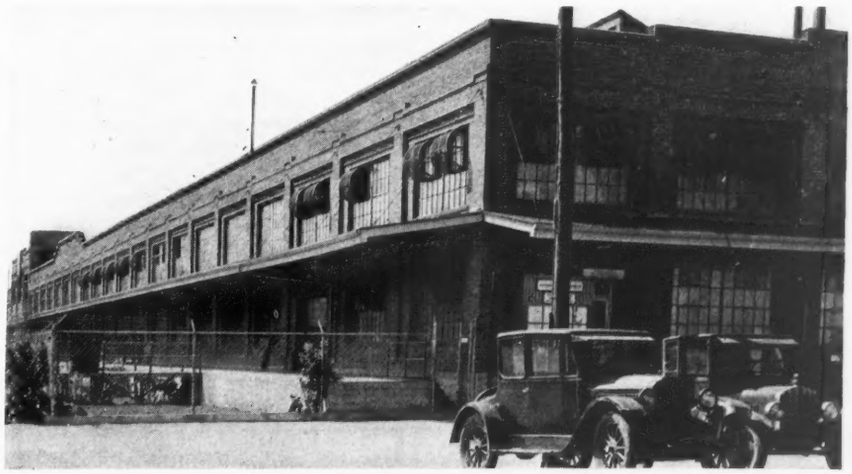
Ants, like mites, come in many varieties. The habits and size of the two pests, however, are vastly different. Ants usually are periodic, or warm-weather, pests and are rather common to food plants everywhere. They vary in size greatly, multiply rapidly, and are generally first discovered traveling in long, winding columns. They seldom enter a plant or bother materials except in vast numbers and their attacks generally are local. To a large extent this is because each group has but one nest, from which it operates as direct as possible. Their nests may be in the walls, floors or foundations of the building, but are more often outside in the ground.

The usual, as well as the most effective, control of ants is by poisoning. Attacks may often be temporarily checked by using one of the highly poisoned materials on the market that produce this effect also by using a fumigant spray[1] on foodstuffs, or roach spray[2] on floors and walls and in cabinets or closets. For a more permanent control, however, slow-acting poisons generally are used (formula No. 6[1]).

Termites look like and often are called white ants, although of very

[2]Food Industries, Vol. 6, p. 113 (March, 1934). *(Turn to page 482)*

¶ In plants where careful thought is given to constructive details, windows are so screened that they may be freely opened for ventilation purposes without danger of flies getting into the plant. One method is to pivot them to swing horizontally through a 180-deg. arc inside a half cylindrical screen fastened flyproof on all sides of the window opening.



Decaying fruits of any kind or quantity are almost certain cause for presence of pomace flies, more commonly known as vinegar gnats.

◆

Keeping a plant free from flies is almost outside the realm of possibility when refuse cans such as these are allowed to stand uncovered.

Automotive FORUM

In Which Are Discussed Practical Automotive Transportation Problems in the Food Field

Favors Two-Man Routes

WE believe the one-horse wagon is still the cheapest vehicle to use on retail routes which are less than ten miles in length, and, as a matter of fact, up to twelve or fifteen miles in length in a city laid out as is New Haven.

An interesting angle of this situation is that, in equipping our one-horse vehicles with rubber tires, we have lessened very materially the draft on the same wagons as against steel tires. This increases the mileage usefulness of the single horse.

How to reduce the cost of the motor vehicle is a problem on which we are now working. The tendencies are for increased, rather than for decreased, costs, particularly because of insurance on the vehicle.

Our experience has been that a two-man shift with a truck has only a limited use so far as satisfaction is concerned, because immediately there arises a divided responsibility which cannot be otherwise handled and hold to account the products, moneys, etc., to one man.

We are testing out this problem in the outlying routes, where we feel, over a scattered territory, we can somewhat lengthen the mileage of long routes and offset this with an added man, thus keeping down the investment and substantially increasing the mileage, because of the fact that back-and-forth run is eliminated on one vehicle.

The increased unitage of delivery has been and is affected very materially and adversely under present operating conditions by the increased, and what we consider temporary, competition of agency dealers or sub-dealers who handle comparatively smaller loads with their business, largely on sympathy, and who ultimately, as soon as jobs present themselves, will go out of the milk-distribution business.

To compensate for this competition, the individual routeman has allotted to him a greater portion of his time for use in combating this condition rather than actual delivery.

We have tried a different division of labor in this respect with the routemen, but find our present condition the more economical, expedient, flexible way of handling this matter.

I realize that I have not answered altogether the question which you asked, but we feel, with the use which we are standardizing on, of a specially constructed type of truck with a drop center, that we are establishing at least a tendency for greater unitage per man in distribution.

In my estimation, the two-man proposition is not going to be the entire solution, but I do believe that it is going to be the solution on about one-third of our routes.—C. R. BROCK, *Brock-Hall Dairy, New Haven, Conn.*

THIS MONTH'S QUESTION

QUESTION 2

Possibilities of Two-Man Milk Truck to Cut Costs

If the one-horse wagon is still the cheapest vehicle to use on retail milk routes which are less than 10 miles in length, what steps can be taken to get the motor vehicle costs below horse-wagon costs?

Can two men be used on the present-day, 1½-ton, dropped-frame milk truck to give a lower cost than with the horse wagon? Or is some form of retail milk truck required as, for example, a truck which will cost the same as a horse wagon and harness and have the same operating and maintenance expense?

Favors the Horse Wagon

I HAVE studied the first part of the question thoroughly and I find that the present cost of a 1½-ton delivery truck is around $1,200, and the life of this equipment about four years. At present cost of gas, together with the tax, to say nothing of the repairs, it costs around $1.50 a day to operate, while the cost of operating a horse-drawn vehicle is around 74c. The horse-drawn vehicle costs around $700, and the life of this equipment is estimated at eight years.

I am afraid two men cannot be used on the present-day, 1½-ton, dropped-frame milk truck to give a lower cost than with the horse wagon, as the helpers are paid 30c. an hour and it requires about five hours to make the delivery. When gasoline and lubricant prices are lowered or when diesel motors are used for the light delivery equipment, then, perhaps, motor vehicles can compete against the horse-drawn vehicle.—G. T. GUSTAFSON, *manager, Biltmore Dairy Farms, Biltmore, N. C.*

Suggests Regular Truck Models

IT is my opinion that the weight of the load will be a serious handicap to anyone endeavoring to replace horse-drawn units with motor units on ten-mile retail routes.

To reduce motor vehicle costs it will be necessary:

1. To reduce the fuel and lubricating costs by:
   a. Reducing the idling time of the motor.
   b. Reducing the low-gear mileage.
   c. Finding a cheaper source of power.
2. To reduce maintenance costs by:
   a. Development of a less severe shock in stopping.
   b. Development of a delayed brake permitting coasting to a positive stop, without manipulation by the driver.
   c. Development of a style of vehicle adaptable to more lines of business than milk and bakery goods, thereby permitting wider sales, larger scale production, and a consequent reduction in cost of replacement parts.
3. On ten-mile routes it will be extremely difficult to keep the motor vehicle costs as low as horse-drawn vehicle costs.

Two men on the present type of drop-center motor trucks can give little more than speed of delivery. This could be turned to economy only by lengthening the routes and handling more business per vehicle. If the extra man is a helper only, he would be expensive. If he is another route man, it becomes a matter of the advisability of combining two wagon routes into one truck route; or the advisability of making one route out of two or three and using two men. The ultimate saving then is problematical.

It may be we need to back up a little in the kind of specialized delivery equipment now being offered and try an ordinary stock panel delivery truck with a driver's seat only. It should have

no back rest, and the cab side open to the rear of the seat. A sliding door could be provided for bad weather.—A. J. CLAXTON, *manager, White Mountain Creamery Co., Lima, Ohio.*

Long Routes the Truck's Forte

WE strive to serve as many homes as possible in a block, therefore after the actual route territory is reached, the motor vehicle cannot render the same distributing service as that rendered by the horse which, to a great extent, follows the service route. This feature of route service seems to eliminate the motor vehicle from the short-haul field.

The high cost of labor and hours of service eliminates the use of two men on retail routes; two men on single horse-driven rigs will serve 60 per cent more retail milk than two men on a motor vehicle. Trucks have their field on wholesale delivery, where stops are infrequent, and on long routes in suburban territory, where mileage is an important factor.—W. H. TIMM, *Harbison's Dairies, Philadelphia, Pa.*

Trucks Still Too Costly

CONCERNING the question as to whether two men can be used on present-day 1½-ton, dropped-frame milk trucks to give a lower cost than that with the horse wagon, we have experimented with this, and have found that it would not be practicable to use the truck, as it does not render the service necessary in order that our patrons may receive their daily requirements in time for use at breakfast.

In regard to the second part of the question, as to whether we believe that some new form of retail milk trucks will be needed to produce delivery costs comparable to the horse and wagon, we have been working on this problem for some time, but as yet have not found a solution that will produce a cost of keeping a truck as cheap as that for the horse, wagon and harness. We have found that expenditures for both the truck and the horse, wagon and harness average about the same, but the horse and wagon still outlive the service of a truck by quite a few years.—ELMER K. SCHWARTZ, *general sales manager milk department, Abbotts Dairies, Philadelphia, Pa.*

To our Automotive Readers:

Realizing the many and varied problems of motorized transportation which are constantly arising in the handling of all kinds of food products, the editor will be glad to receive suggestions as to what are the particularly pressing problems that readers would like to have discussed in these pages.

Helper Would Increase Costs

WE believe that certain steps can be taken to get the motor-vehicle costs below horse-wagon costs (if routes operate approximately 10 miles per day) and that these steps should include the mass production of specialized delivery equipment, resulting in low initial cost of unit, plus cheap fuel cost. Possibly this will be brought about by the introduction of a diesel type of motor which will allow the purchase of low-gravity fuel. Using as an example the St. Louis market, because that is the one I am familiar with, we pay our union drivers $35.88 per week on a basis that they deliver 6,250 points per month. For additional points above the base, we pay a commission of 1 cent per point. Consequently, assuming that a horse-drawn vehicle, with an overhitch of 18.6 per cent, costs $51.47 a month to operate, and that the driver's salary is $153 per month, and that the route sales are 275 points per day, or 8,250 points per month, the additional commission to the driver would amount to $20 per month, making a total cost for delivering 8,250 points $224.47, which would be at the rate of approximately 2.7c. per point.

Suppose we were to add an extra man on our 1½-ton truck, which also delivers 275 points per day, for which we would have to pay this helper, according to the union scale, $134 per month, we would have the following comparison, were we to double the business of this route and raise it from 8,250 points per month to 16,500 points per month:

	Cost per Month
Cost of 1½-ton twin coach, approximately 2 years old	$75.82
Driver	153.00
Helper	134.00
Commissions	92.50
Total	$455.32
Cost per point	2.77¢

You can see from the above comparison that, were we fortunate in doubling our business with the addition of a helper on a twin-coach truck, the cost per point would still be a little bit higher than a single horse-drawn vehicle operated by one delivery man, and I would say that in this market it would be physically impossible to double the business on any given route by the addition of a helper.—EDWIN A. KAYSER, *vice-president, St. Louis Dairy Co., St. Louis, Mo.*

Electrics Cheaper Than Horses

WE have used for years some electric vehicles for the delivery of milk on short routes. Looking up the matter of cost, we find that, on a route of ten miles or less, the half-battery electric vehicle is slightly less expensive to operate than the horse and wagon. Add to this the matter of minor accidents caused by the movement of a horse while left by the driver, the horse-drawn route would cost more; and right at present, with feed costs going up, the cost would be further increased.

Gas-operated vehicles are more expensive, but the motor vehicle manufacturers are leaving no stone unturned to reduce this difference. We have no experience on two men operating one wagon over an increased territory somewhat in the neighborhood of two former routes, although the question presents a very interesting point.—DR. F. M. WALMSLEY, *chairman, board of directors, Borden's Farm Products Co. of Illinois, Chicago, Ill.*

Retail Milk Route Costs With Trucks and Wagons

Figures apply to conditions in Unionized Mid-Western city territory for the year 1932. Drivers' wages, commissions, bonuses, etc., are not included in the costs given below.

No. Units in Service	Age in Service	Description	Fixed Expense per Month	Operating Expense per Month	Total Fixed and Operating Expense per Month per Unit	Average Monthly Miles per Unit	Average Miles per Day	Cost per Mile	Average Monthly Points per Unit	Cost per Unit
8	2 yr. 6 mo.	Truck A, 4 cyl., gas	$24.12	$69.04	$93.16	1,163	38.8	$.0801	8,807	$.0105
11	1 yr. 9 mo.	Truck A, 4 cyl., gas	24.12	52.52	76.64	973	32.4	.0787	8,540	.0090
5	1 yr. 9 mo.	Truck B, 4 cyl., gas	24.13	51.69	75.82	939	31.3	.0811	9,477	.0080
4	1 yr. 9 mo.	Truck C, 4 cyl., gas-elec	24.12	63.59	87.71	820	27.3	.1068	8,706	.0101
104	.....	Single-Horse Routes	12.01	39.46	51.47	252	8.4	.2042	7,619	.0067
16	.....	Team-Horse Routes	19.47	81.20	100.67	410	13.7	.2453	7,771	.0129

Actual wagon and truck costs on retail milk routes in Mid-Western territory for the year 1932. Trucks A and B were operated on routes of approximately the same length but Trucks C were operated on shorter routes. The one- and two-horse wagons were operated on much shorter routes than any of the motor vehicles. In comparing the costs of different types and makes of vehicles on retail milk routes, the lengths of the routes must be about the same in order to indicate which is most economical.

NEW EQUIPMENT TO BE SEEN AT DAIRY INDUSTRIES EXPOSITION

FLYING the banner, "Modernize for Profit," more than 220 exhibitors will display their wares at the Dairy Industries Exposition to be held in Cleveland, Oct. 15-20, the food industry's largest machinery show. And some 12,000 dairy products manufacturers from every State and a dozen foreign countries are expected to be on hand to stop, look and buy.

Among the fluid-milk distributors at the exposition there will be much interest in the milk irradiators, what with the trend toward vitamin D milk. Three of these machines will be on hand. Creamery Package Manufacturing Co., Chicago, will display its carbon-arc, inclosed cylindrical unit, the standard size of which has a capacity of 4,000 lb. of milk an hour. Alloy Products Corp., Waukesha, Wis., and Cherry-Burrell Corp., Chicago, both have been perfecting irradiators and are expected to have them ready for the show.

Distributors of bottled milk are coming more and more to the use of hoods or special caps to protect the pouring lip of the bottle and add sales appeal to the container. Of interest in this connection will be the aluminum-foil capping machinery of Sanitary Metal Cap Corp., Syracuse, N. Y. This equipment forms the cap, stamps in the label and applies the cap to the bottle, recessing the foil into the mouth of the container. This closure obviates the paper-disk cap and is available in many different colors for grade differentiation. Another aluminum-foil capping machine will be exhibited by Alka Bottle Capping Machine Co., New York. Equipment to be exhibited by Package Machinery Co., Springfield, Mass., hoods with transparent cellulose, securing the cellulose in place with tamperproof tape.

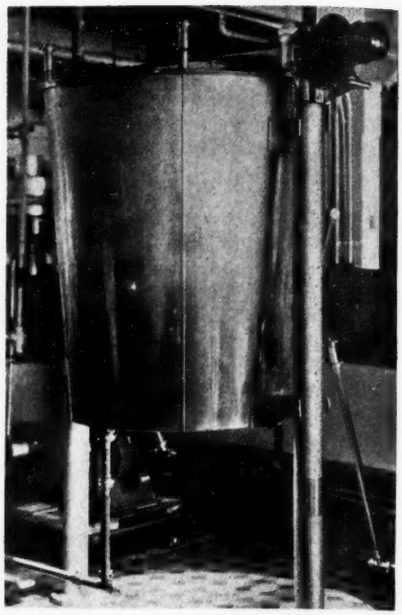
Dairymen contemplating buying a separator will find two new machines at the exposition. Westfalia Separator Co., Bloomfield, N. J., will demonstrate a unit designed to deliver milk free of foam and under sufficient pressure to carry it to any part of the plant. A separator with a built-on hoist for lifting the bowl will be exhibited by De Laval Separator Co., New York, together with a no-foam clarifier. The De Laval clarifier can be equipped with both separator and clarifier bowls and cover.

A small, compact, soaker-type bottle washer in the low-price class has been introduced by Cherry-Burrell Corp., and will be at the exposition. Though small, this machine gives each bottle thirteen separate treatments, including chlorine sterilization. Another soaker-type washer, an improved air-brush machine, is to be displayed by Michael Yundt Co., Waukesha, Wis. It is a unit of large capacity.

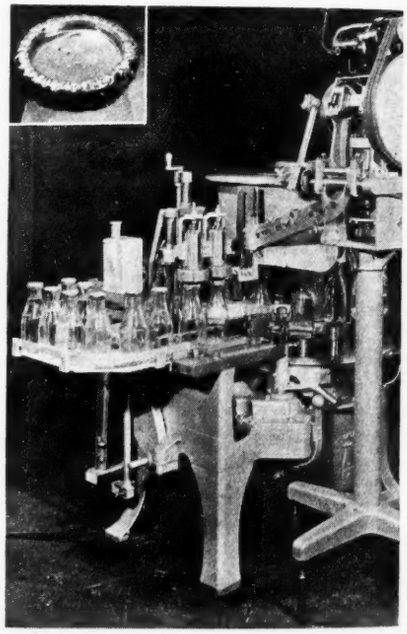
Pfaudler Co., Rochester, N. Y., will set up at the Dairy Industries Exposition a 300-gal. cream-recirculating, vacuum-process unit. This deaerates and deodorizes the cream during a cycle of heating, cooling and aging, and improves the quality of the butter. Pfaudler also will have on hand its new streamlined, stainless-steel truck tank.

Another machine designed to improve butter by treating the cream will be shown by the Fort Wayne Dairy Equipment Co., Fort Wayne, Ind. This unit comprises a revolving, cylindrical screen filter. The filtered cream, caught in a pan under the screen, is free of curd and all extraneous matter.

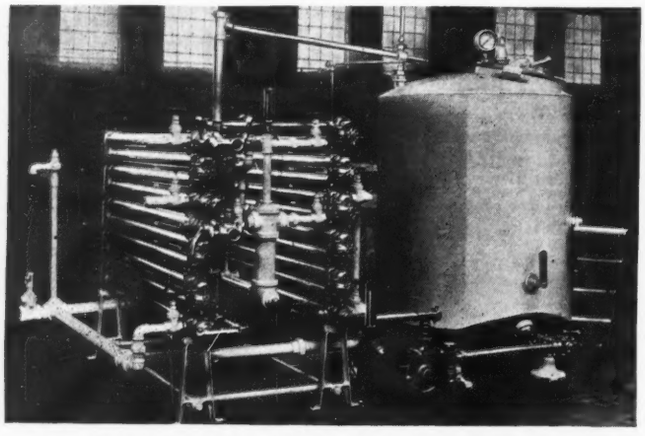
American butter manufacturers will be attracted by an automatic butter molding and wrapping machine brought over from Switzerland. Sold by Walker-



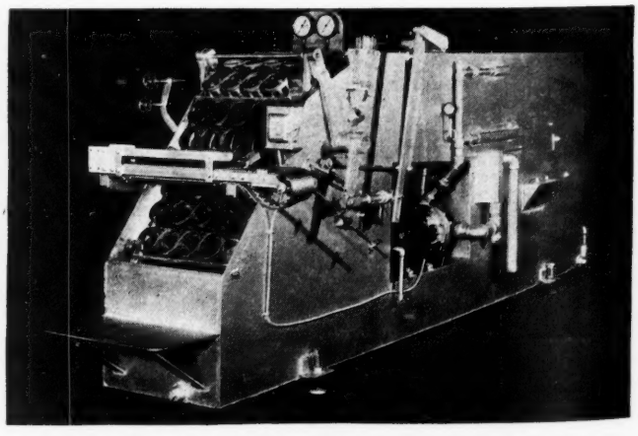
Milk irradiator built by Creamery Package Manufacturing Co.



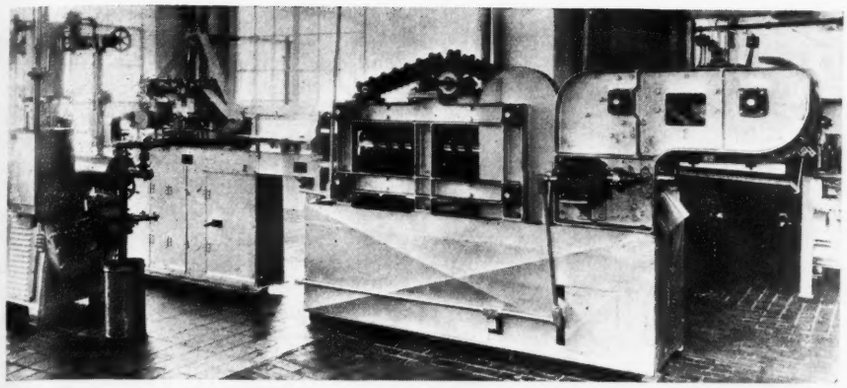
Aluminum-foil bottle capper manufactured by Sanitary Metal Cap Corp., with inset showing cap.



Cream deodorizer introduced by Pfaudler Co.



Small soaker-type bottle washer of Cherry-Burrell Corp.



Small, individual-service-bulk-ice-cream plant developed by Vogt Processes, Inc.

Wallace, Ltd., Toronto, the machine will take butter direct from the churn, form it into half-pound or pound units of accurate weight, emboss it and put on the wrapper.

A new development in milk coolers may be seen at the exposition in the "Compact" cooler of Mojonnier Bros. Co., Chicago, a unit fabricated not from tubes but from corrugated chrome nickel sheets. The sections swing open fanwise for cleaning.

Aluminum milk storage tanks insulated with layers of crumpled aluminum foil, a new line by Aluminum Co. of America, Pittsburgh, Pa., will be included in an extensive exhibit of aluminum products, as will a kettle for cooking syrup and a rubber-covered bucket for use in glass-lined tanks.

Many ice cream manufacturers attending the exposition will have their first opportunity to see equipment for making individual-service bulk ice cream. Vogt Processes, Inc., Louisville, Ky., will exhibit a unit recently developed for the smaller plants. Designed to turn out 100 gal. an hour, the equipment is suitable for plants with a capacity of 250,000 gal. or larger. In addition to its small size and lower cost, this equipment has a marked advantage over the large unit heretofore used in that it includes a hardening box which eliminates the need for a hardening room.

Another exhibit that will interest the small ice cream manufacturer is that of a Junior Vogt Instant Freezer made by Cherry-Burrell Corp. This is a new unit having a capacity of 60 gal. an hour. It incorporates improved features of design, such as a rotary seal that takes the place of the usual packing gland. An improved batch freezer of 40-qt. capacity is to be shown by York Ice Machinery Corp., York, Pa. This unit has an automatic batch weigher, a cylinder with a 50-per-cent overcapacity to allow rapid incorporation of air and decrease freezing time; and several other improvements.

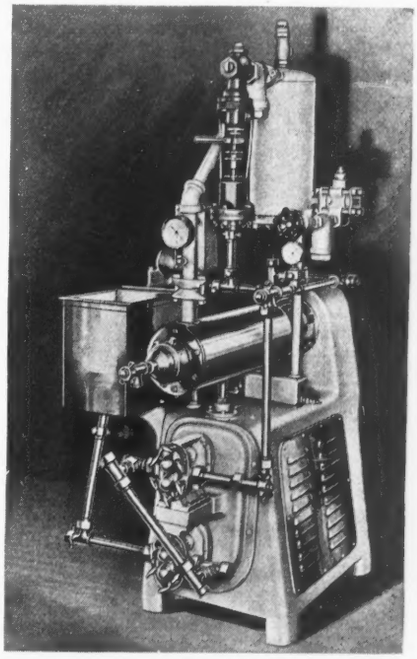
Two new developments in the line of cutting equipment will be shown to the ice cream manufacturer. The newly formed W. & S. Machinery Co., Cleveland, Ohio, is to exhibit a slab cutter that may be adjusted for different cuts without the use of tools and which has a compressed air-expelling device. Kay Machinery Co., Inc., Cleveland, has arranged to display cutting machines with the company's recently developed air compressor and ejector.

Bergmann Packaging Machine Co., Pittsburgh, has scheduled an exhibit of its new Model J double-action hand filler. Designed for containers from one-eighth pint to one quart, the filler accurately measures the desired quantity of ice cream.

With restrictions on the dimensions and wheel loads of highway-operated motor trucks becoming more and more severe, much attention will be paid by dairymen at the exposition to two new cab-over-engine trucks. One built by White Co. is a heavy-duty vehicle with a gross weight rating of 26,000 to 30,000 lb. The truck has a short over-all length and the load is sufficiently forward that one-third of the weight falls on the front wheels. The motor, a 12-cylinder, horizontally opposed engine with many new features of design, pulls out from under the cab for easy accessibility. Replaceable cylinders and screwed-in Stellite valve seats are two of the many improvements.

General Motors Truck Co., Pontiac, Mich., also will exhibit cab-over-engine trucks with good weight distribution, removable engine, short over-all length and other improvements. These are available with wheelbases from 94 to 160 in.

In the line of truck refrigeration, there will be at the exposition the new "forced-convection" system of Kold-Hold Manufactuirng Co., Lansing, Mich., and the Frigid-Gel system of Fitz Gibbon & Crisp, Inc., Trenton, N. J. The former consists of an insulated housing containing three Kold-Hold cooling units and connected to ceiling ducts through which the air of the body is circulated by a thermostatically controlled blower. The Frigid-Gel system uses an Icefin conduction or radiation plate covered with 1 in. of eutectic gel which stores enough refrigeration for one day's operation. Mechanical or solid CO_2 refrigeration may be used to freeze the gel.



Vogt Instant Freezer for small plants, manufactured by Cherry-Burrell Corp.

Among the miscellaneous dairy industry equipment to be exhibited at the exposition will be interesting displays of instruments by Bristol Co., Waterbury, Conn., and C. J. Tagliabue Manufacturing Co., Brooklyn, N. Y. Manton-Gaulin Manufacturing Co., Inc., Everett, Mass., will attract much attention with its latest development in homogenizing equipment. This is a small laboratory unit of 12 gal. per hour capacity with a maximum pressure of 4,000 lb. per square inch.

While only the new equipment to be exhibited at the exposition has been mentioned in this article, there will be hundreds of other modern machines to be seen. Anyone contemplating a modernization program will have an excellent opportunity to look over the field of available equipment.

Streamlined, heavy-duty, cab-over-engine truck built by White Co.

WHAT'S ON YOUR MIND?

Whence Does *the Gas Come?*

To the Editor of FOOD INDUSTRIES:

My interest has been intrigued, no less, by Mr. Bredt's article in your magazine entitled "Where Does the Gas in Coffee Come From?"

My own work and experience in the coffee industry would lead me to believe that the gas from coffee comes from an entirely different source than called for by Mr. Bredt's theory and, therefore, I am inclined to carp, not to say cavil, at the idea that amino acids have anything to do with the evolution of coffee gas. Please understand that I have nothing against amino acids. I am perfectly willing to have a male and female amino acid put in each pound of coffee and let Nature take its course, but before accepting the amino-acid theory I would like to have the evidence of the following bits of experimental work explained away:

Experiment No. 1—About 1914 I was engaged in some work on petroleum cracking involving the use of high-pressure autoclaves. One of my co-workers decided there was a possibility of cracking molasses into alcohol or acetone or something. He, therefore, placed about one gallon of molasses in an autoclave made of $\frac{7}{8}$-in. boiler plate and provided with a pressure gage registering 175 atmospheres. He gradually heated the molasses in this autoclave with a gas burner, but, being of a cautious disposition, watched the pressure gage through a telescope and provided the autoclave with a remote control valve for the gas. The pressure in the autoclave increased gradually to about 50 atmospheres, and suddenly things began to happen. The needle of the pressure gage traveled rapidly until it struck the pin at the 175-atmosphere mark. At this point my friend left the building after turning off the gas. After a suitable interval, he returned and found the needle bent in a neat curve around the pin on the gage. By cracking a valve, he obtained a sample of gas which was mainly carbon dioxide. When the autoclave was opened it was pretty well filled with porous carbon.

This experiment would indicate that sugar under certain conditions of temperature and pressure will decompose and form plenty of carbon dioxide. It is well known that sugar is present in coffee beans and that after roasting a product resembling caramel is in the coffee extract.

Experiment No. 2—In the course of developing a coffee flavor for ice cream which later resulted in U. S. patent No. 1,716,323, I had occasion to grind freshly roasted coffee in a small pebble mill with pure vegetable oil. The pebble mill was closed. Grinding the coffee with oil in the pebble mill resulted in the evolution of so much gas that the rubber gasket on the pebble-mill cover was blown off. When the greater part of the oil was removed from the fluid mass by hydraulic pressure, the resulting cake was found to be free from gas.

It is also well known that the finer freshly roasted coffee is ground, the less gas it contains. Dr. McKinnis, working at Mellon Institute, has found that by the simple process of squeezing ground coffee through heavy steel rolls, he removes the bulk of the gas by purely mechanical means.

Experiment No. 3—In 1927 while examining some old samples of coffee, I picked out one which was two years old and certainly free from gas. I placed about a pound of this old ground coffee in an empty carbon-dioxide cylinder and then turned the full pressure of a filled cylinder into the one containing the coffee. I allowed this system to stand 48 hours, then disconnected the full cylinder, removed the valve containing the coffee and dumped the coffee out on a table top. After examining it for a few minutes and satisfying myself that the physical appearance of the coffee was unchanged, I sealed the coffee in No. 1 sanitary cans. At the end of two hours all of these cans blew up.

Since it takes a pressure of approximately 200 lb. to the square inch to blow up the side seam of a No. 1 sanitary can, I reasoned that the cell structure holding the original gas in the coffee was still in approximately the same condition as when the coffee was freshly roasted and ground and permeable to carbon-dioxide gas from the inside out as well as from the outside in. By soaking the coffee in carbon-dioxide gas under approximately 1,000 lb. pressure to the square inch an equilibrium was reached between the gas outside of the coffee granule and the cells inside. When the outside pressure was removed, the gas started to come out of the cells in exactly the same way as it does as soon as the roasting process is complete This resulted in the development of sufficient pressure inside the No. 1 can to blow it apart.

The very fact that in the process of roasting the coffee bean swells and is very considerably increased in volume at the end of the roasting period is certainly an indication that high pressures have been developed. The fact that practically all the water leaves the coffee before the swelling takes place is evidence that the pressure is developed from the decomposition of an organic compound or compounds.

At this time, and for no particular reason, I am reminded of the words of an ancient Chinese poet, which freely translated and slightly expurgated, read as follows:

"The Sacred Ibis of the Wang Poo River
Wadeth into the waters even unto its armpits,
There squawketh he three times,
But why he doeth so
No man knoweth."

THOMAS M. RECTOR,
Director of Engineering Research,
General Foods Corp.

Industrial Pensions

(Concluded from page 443)

time and has come through 100 per cent. Why not let us use life insurance companies in the future and eliminate completely all hazard? It is only through the medium of life insurance that we can set small sums aside regularly and keep those sums working for us continuously. We have all been asked to contribute to unemployment funds and relief agencies, and a great many of us have had either to support or assist in the supporting of our relatives. This is not a good condition and cannot be corrected overnight. However, the proper steps can and should be taken now to prevent the possibility of this condition recurring in the future.

We charge off on our books for depreciation of buildings, machinery, and equipment and we build up a reserve for maintenance and replacement. What have we done for our man power?

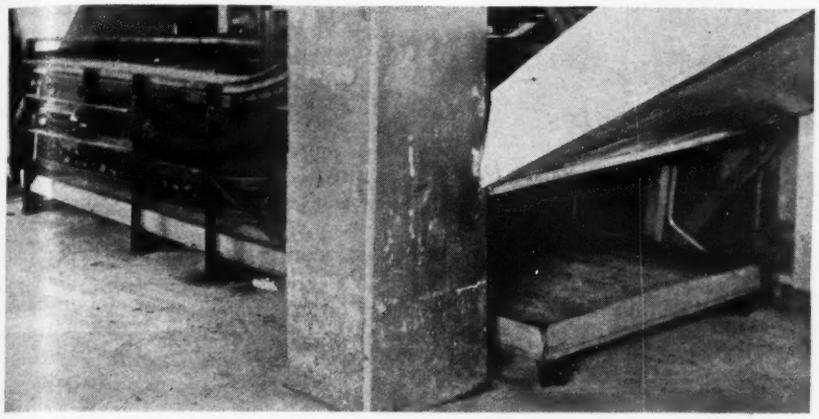
Raisin Oil

(Concluded from page 445)

use in the frying of doughnuts and potato chips, to which it transmits an attractive, non-greasy flavor.

Much of this oil has been used in the paint industry, particularly on canvas, for awnings and airplane wings, wherein its relatively slow drying factor and its high spreading quality are of particular utility. Canvases are left soft and pliable when oiled with this oil, instead of becoming harsh and stiff. It is likewise finding use in those lubricants wherein a vegetable oil is required.

IDEAS . . . FROM PRACTICAL MEN



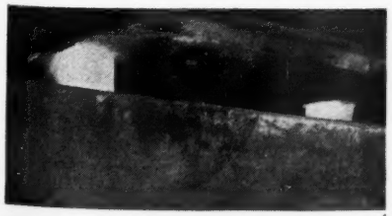
DRIP PAN FOR CONVEYORS

A great aid to cleaning is the wooden drip pan used in the Sacramento plant of California Packing Corp. Equipped with casters at one end, the pan slides under the inclined conveyor to catch the drip from tomatoes and other produce. The chute under the conveyor drains the waste into the pan.

Solid CO_2 "Spots" Tank

Where space is cramped and an overhead crane cannot be had, solid CO_2 will serve effectively as a tool for placing heavy equipment. Take the case of a large ice cream plant in New York. The plant had fabricated, by welding, a 6,500-lb. brine tank measuring 20x13x5-ft., the tank being supported on wooden cribbing while the welding was done, so that all parts were accessible. When the tank was completed and had been moved approximately into place, the plant engineer evenly spaced underneath six blocks of solid CO_2, each a 10-in. cube, and lowered the tank onto these blocks with jacks.

When the tank first rested upon the solid CO_2, friction between it and the supporting cubes was so slight that it was easily shifted into the exact position over the foundation.

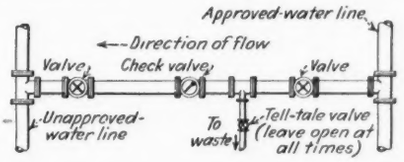


Once in place, it was braced to prevent lateral movement and allowed to settle. The solid CO_2 required about five hours to melt, but the time can be varied either way by applying heat or insulation to the cubes.

Solid CO_2 will sustain heavier loads than the 11 lb. per square inch applied in lowering this tank, but six blocks were used to insure uniform settling. An advantage of solid CO_2 for spotting is that it leaves no moisture under the equipment, as does water ice.

Telltale Protects Pure Water

Sometimes it is necessary to connect a water system carrying impure water with one carrying water to be used in the product. For instance, conditions may require that lines



carrying city water be connected to those containing water drawn from a river or lake and used for cooling or other purposes, the tie-up being an emergency arrangement.

Under such circumstances contamination of the pure water through leaky valves must be avoided. To do this, two gate valves, a check valve and a telltale should be installed in the connection. As shown in the accompanying sketch, when the connection is not in use, the open telltale valve will allow all leakage to go to the sewer. Should the connection be in use and pressure be restored to the impure water system, the check valve will close and, unless it leaks excessively, the flow through the telltale will prevent contamination until the shut-off valve may be closed. As it is practically impossible to prevent a check valve from leaking, or even to predict its positive action, two check valves should be used in series where conditions are unusually severe.

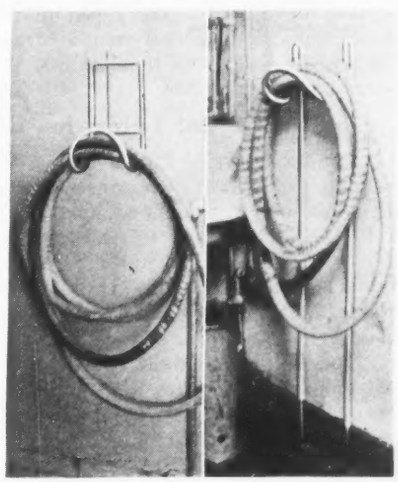
H. G. PLENUM, *Mobile, Ala.*

How to Keep Your Hose Up

Steam hose has no place on the plant floor, and it never is found there in a large West Coast dairy plant, where hangers of various designs have been developed to meet all conditions. Two of these are illustrated. The one on the right is alongside a hardening-room wall which is mostly of insulating material and would not provide a good anchorage. Consequently, the hanger is supported on legs embedded in the concrete floor. It is made of 4 ft. of $\frac{3}{4}$-in., cold-rolled steel bent to shape and brazed into two pieces of $\frac{3}{4}$-in. pipe. The one shown on the left is fastened to the studding, through the plastering, by the two lag screws. It is made of $\frac{5}{8}$-in. rod, shaped and welded to two cross members and a flat piece.

Other hangers used in the plant hook into holes in the wall, some are bolted to the wall and still others clamp to pipes.

BILLIE BURGAN, *San Diego, Calif.*



$3 FOR YOUR THOUGHTS

FOOD INDUSTRIES pays $3 or more for practical ideas for this page. Send yours in, with any necessary sketches or photographs.

THINGS HAVE HAPPENED . . .

- *Basic code goes through minus trick clauses*
- *Industries get O.K. on needed code changes*
- *Canners say nay to Riley's plan for labeling*
- *Food field fights increase in freight rates*
- *Two codes get high praise for rescue work*

Food Industries Get Basic Code After Long Wait—It's a Good One

At last the grocery manufacturing industry has a code under which it can establish uniform trade practices and drive out the chaos bred by unfair competition. After thirteen months of disappointing delay during which the industry and the N.R.A. waged a seesaw battle behind the scenes, Administrator Armin W. Riley finally passed the pact to the office of Gen. Hugh S. Johnson, where it was signed Sept. 21.

Thanks to industry representatives who fought their demands through to the last ditch and refused to be saddled with trade practice regulations that might react against business, the code is expected to benefit every branch of grocery manufacturing and distribution. Officials at Washington had tried to drag in by the heels provisions having a suspicious resemblance to certain clauses of the so-called Tugwell Bill, but they had to give it up.

If for no other reason, grocery manufacturers will be thankful for the code because it will put an end to the tactics of a variety of chiselers. No longer will it be possible for mass buyers to insist on advertising allowances, brokerage fees or other concessions. And some manufacturers will save enough by this to lower prices.

The wholesale and retail divisions of the grocery field, too, will be benefitted, for they have been handicapped in the proper application of their own fair trade practices by absence of regulation at the source of their products.

Offered to All Industries

By Administrative Order No. X-89, the code is offered to each grocery manufacturing industry not yet codified in lieu of the basic code and to each codified industry in lieu of its own code. And all codified industries are requested to modify their own codes to make the provisions substantially comparable with those of the general code. Any uncodified industry which has not applied for the code within 30 days of its approval will be subject to a hearing.

The trade practice provisions of the code bar payment of brokerage to buyers, a source of much evil in the industry. And they rule out payments for unearned service, destructive price cutting, unreasonably low quantity prices, unearned discount for cash, giving of prizes or premiums by lottery or other fraudulent means, commercial bribery, false or deceptive labeling and advertising and unfair interference with the business of competitors. In addition, the code establishes compulsory open prices with no price lag.

PAUL S. WILLIS
Led industry in fight for code

WHAT CODES COST

Several food code budgets were submitted to N.R.A. during September, and the candy manufacturing and other food industries added their names to the already large list of those seeking exemption from Administrative Order X-36 so that the code assessments may be extended to all manufacturers. The following are the code budgets submitted:

Industry	Period	Amount
Atlantic mackerel	May 14 to Dec. 31	$3,600
Candy manufacturing	June 22, '34, to June 15, '35	222,050
Fishery industry	Year to March 31, '35	75,000
Fish preparing and wholesaling, North Middle Atlantic	April 1 to Aug. 31	4,930
Imported green olives	Aug. 6, '34 to July 31, '35	7,725
Wholesale lobster	April 1, '34 to March 31, '35	22,028

The labor provisions of the code stipulate a maximum 40-hour week and an eight-hour day, with the usual exemptions. Employees are permitted to work overtime for six hours a week during any eight weeks in a calendar year, but they must be paid time and one-third for overtime.

Workers shall be paid a minimum of 40 cents an hour in the North and 35 cents in the South, with a discount of five cents an hour for "light" work, such as that commonly performed by women. Female help doing the same work as men will receive the same pay. The minimum pay of office workers is $16 a week in cities of over 500,000 population, $15 in cities with a population between 250,000 and 500,000 and $14 in other cities. Watchmen must be paid $18 for a 56-hour week.

How Code Is Administered

In the administration of the code, each industry will have its own code authority, which will allay the fears of oppression on the part of small manufacturers. Then there will be established a National Food and Grocery Manufacturing Advisory Board, a coordinating agency for all the industries and to which all common matters may be referred. It will be composed of one member selected by each individual industry code authority. This board will appoint representatives to serve on a Food & Grocery Industry Conference Committee to be composed of men from the wholesale, retail and manufacturing fields and to act as a coordinating agency for the entire food and grocery trade.

Riley Calls Master Confab

All of the many trade problems of the various grocery industries are to be aired simultaneously. Division Administrator Armin W. Riley has requested all food code authorities for the manufacturing, wholesale and retail grocery trades to appoint representatives to a joint trade conference committee, and a meeting will be held soon.

Processing Tax on Peanuts

Secretary Wallace has placed a penny processing tax on peanuts to procure funds for benefit payments to producers agreeing to police production. Effective Oct. 1, the tax will be levied against the first domestic processing, defined as "cleaning, polishing, grading, shelling, crushing or other processing thereof." It will not apply to peanuts crushed into oil or to floor stocks of manufactured peanut products. The tax is only little more than one-third the difference between the fair exchange value of 5.6c. a pound and the average farm price of 2.8c.

Credit Codes With Saving Two Food Industries

In at least two food industries, mayonnaise and shrimp, there is gratification for the codes of fair competition. "Several hundred mayonnaise manufacturers were saved from bankruptcy and the entire industry from serious losses" when the code authority recently fixed a "lowest reasonable cost" for the trade, according to W. F. L. Tuttle, managing agent of the code authority. A very serious situation had developed when one of the two largest manufacturers drastically cut prices. Most of the other manufacturers were forced to make similar or greater reductions to protect their business, and ruin threatened the industry. However, the code authority declared an emergency, fixed the lowest reasonable cost in accordance with its powers, and now the industry is on even keel again with prospects bright.

In addition to meeting this emergency, the code, Mr. Tuttle maintains, has raised the standards of quality, improved consumer service, established fair and reasonably stable competitive conditions and substantially increased wages.

The shrimp industry code, according to Monterey Sardine Industries, Inc., a cooperative concern of sardine boat operators, has stopped "destructive price cutting, chiseling, rebates and such practices," which had brought the industry "almost to the brink of ruin."

Changes in Code Personnel

Code executive bodies for the refined fish oil and imported green olive industries were recognized during September, and a temporary executive committee for the New England sardine canning industry was approved, to serve until Nov. 30. Other developments in code personnel were the appointment of Ralph Dulany to succeed Francis A. Harding, resigned, as chairman of the code authority for the canning industry; the designation of George A. Chapman, Riverdale Products Co., Chicago, as adminstration member of the candy code authority; designation of Henry Stude as charman of the baking code authority; and the appointment of state supervisors for the bottled-soft drink code. Still other changes are the appointment of G. W. Sharpe of Beech-Nut Packing Co. to the coffee code authority to succeed James F. Brownlee, who resigned; the designation of T. A. Crawford, Jr., Louisville, Ky., as non-association member of the spice-grinding code authority; and the selection of Adlai E. Stevenson, Chicago, as administration member of the code authority for the wheat-flour-milling industry. The following are the new code executive groups:

REFINED FISH OIL

Werner G. Smith, Werner G. Smith Co., Cleveland; Ernest V. Moncrieff, Swan-Finch Oil Corp., New York; Fred E. Loud, Murray Oil Products Co., Philadelphia; Louis J. Reizenstein, Falk & Co., Pittsburgh; and S. R. Kaas, Atlas Refinery, Newark, N. J.

IMPORTED GREEN OLIVES

C. D. Mawer, Mawer-Gulden-Annis, Inc., Brooklyn; John Magee, John Magee & Co., New York; Oscar Wolff, M. Wolff & Sons, Chicago; Philip Zitzmann, P. Zitzmann & Co., Brooklyn; and Harry C. King, King, Fuller & Co., Chicago.

NEW ENGLAND SARDINES

Alvin C. Ramsdell, Carroll B. Peacock and Frank B. Pike, all of Lubec, Maine; R. B. Stevens, Yarmouth, Maine; and James Abernathy, West Pembroke, Maine.

W. F. L. TUTTLE
Says Code Aided Mayonnaise Men

Drops Plan to Restrict Resale Milk Prices

A.A.A. apparently has changed its mind about going in for milk marketing agreements which set maximum resale prices as a means of checking price rises due to the drought. Late last month, an unofficial report from Washington indicated that this plan practically had been dropped.

However, the administration is going ahead with its move to increase prices to producers, recently authorizing an increase in the Los Angeles milkshed. A price advance has been pending for Chicago but has been deferred. Effective Sept. 24, the Baltimore license was amended to include bakery and confectionery milk in the Class 1 price schedule and to lower slightly the price for Class 3 milk.

In Boston, conditions finally forced the A.A.A. to file a bill of complaint seeking to restrain Whiting Companies, second largest distributor in that market, from continued violation of the license.

Two Minor Codes Approved by NRA; Important Changes Made in Others

In addition to approving the long-awaited "master" food manufacturing code, the N.R.A. in September approved two minor codes and took action on proposed changes in some existing pacts.

The approved codes cover the flavoring products industry and the New England fish preparing and wholesaling division of the fishery industry, both being effective Sept. 17. Among the changes made in codes, one of the most significant is the amendment to the macaroni code which permits members of the industry to enter into an agreement providing for "liquidated damages," to cover code violations. Ostensibly intended to avoid court action to determine the extent to which a code violation has harmed a person or firm, the amendment provides that the industry may institute a method of automatically assessing fines for code violation by its members. The amount of the fine is to be regulated by a fixed schedule. This system will bind only those firms that subscribe to it voluntarily.

At a hearing late in September on proposed changes in the macaroni code, the code authority asked that the word "noodles" be barred in describing a product containing less than 5.5 per cent of egg or egg-yolk solids. Opposition to this change was expressed by a number of manufacturers on the Pacific Coast and by manufacturers of so-called "chow mein noodles." Another amendment considered at the hearing would redefine the various types of flour.

Another important N.R.A. decision was the granting of permission to canners to pay tomato peelers on a flat piece rate basis rather than by the wage scales specified in the canning industry code. To last during the 1934 season, the piece rate basis requires the canner to pay tomato peelers 9c. a 16-qt. basket in the North and 8c. in the South.

By a plan approved late in September, a new code authority for the milling industry is to be elected by Nov. 1. The executive body will consist of 16 millers chosen from 10 regions, with representation from each region based upon its milling capacity. The millers also received official announcement late in the month that the clause of their code preventing destructive cutting would be made effective, the stay being lifted.

On Aug. 28, soft-drink bottlers were permitted to extend their code assessments to all bottlers, regardless of whether or not the manufacture of soft drinks was their principal line of buiness. Regulations covering the sale of equipment by bottlers also were approved recently. The big problem of the bottlers, however, that of establishing "lowest reasonable costs," is still unsettled, N.R.A. refusing to approve a "lowest cost" schedule. The bottlers are still conferring with N.R.A. on this.

The ice cream cone industry late in September made application for a code amendment that would permit it to use a "liquidated damages" system similar to that of the macaroni industry.

Canning Committee Report Opposes A, B, C Labels

In making its report to Armin W. Riley late in September, the labels committee of the canning industry reiterated its opposition to the proposed "A," "B," "C" system of labeling. However, the canners are amenable to "descriptive labeling," stating in the report that the housewife is entitled to information as to the style or manner in which the particular commodity is packed; the size of the product; the number of pieces within a given range; information as to the maturity or texture; addition or absence of seasoning; information as to deficiencies in workmanship; and certain other factors of informative value in the case of particular products (such as consistency in cream style corn).

In a minority report, John Baxter, speaking for Maine canners, opposed descriptive labeling and recommended that "a permissive system of graded labeling be offered to those canners who wish to avail themselves of it."

The advisory committee on standards for the administration has criticized the canners' proposals as "failing to meet the needs of the consumer."

National-American Wholesale Grocers' Association has expressed agreement with the canners, opposing the alphabetical system and upholding descriptive labeling. It brands alphabetical labeling as an attempt to standardize canned foods irrespective of natural variations as to quality, thereby putting all similarly graded canned foods on an equal competitive basis.

While the canners and distributors fight out their labeling problems for canned foods, work is being undertaken toward elimination of misleading and confusing terms in the designation of grades and qualities of all commodities by American Standards Association. This association is working at the request of N.R.A. Consumers' Advisory Board, and hopes to bring about some correlation in the meaning of various terms such as "fancy," "No. 1" and "A."

Redraft Wine Regulations

At the hearings held last month on the wine industry regulations proposed by the Federal Alcohol Control Administration, the code authority suggested so many changes that the regulations are being redrafted, and no definite action can be expected for some time. The proposed regulations seek to extend the code for the wine industry to those who make wine otherwise than by crushing grapes, and also to set up new standards for the industry. They propose definitions for different types of wines and provide for more informative and accurate labeling.

LEROY PETERSON

Poultry Racketeers on Run

Racketeers are on the run in the New York live poultry industry, federal prosecution and the anti-racketeering provisions of the live poultry code having dislodged them from their graft-gathering "monopolies." That is the picture painted by Leroy Peterson, supervisor of the code. Speaking before the meeting of the North Eastern Poultry Producers' Council, Sept. 15, Mr. Peterson stated that "the racket which has demoralized New York's live poultry industry in past years has been crushed and the racketeers driven to cover."

However, Mr. Peterson emphasizes that there is yet need for elimination of monopolies in cooping and trucking operations to effect further reductions in distribution costs. Additional savings of $1,000,000 annually are possible, he estimates.

CONVENTIONS

OCTOBER

8-13—United States Brewers' Association, Master Brewers' Association, United States Brewers' Academy and Wahl-Henius Institute, New York, N. Y. Also an exposition, Grand Central Palace, New York.

12-16—Institute of American Meat Packers, annual meeting and exhibit, Drake Hotel, Chicago, Ill. W. W. Woods, 59 East Van Buren St., Chicago, president.

15-17—International Association of Milk Dealers, Statler and Carter hotels, Cleveland, Ohio. R. E. Little, secretary, 228 North La Salle St., Chicago Ill.

15-17—Certified Milk Producers' Association, Hotel Statler, Cleveland, Ohio. Dr. Harris Moak, 360 Park Place, Brooklyn, N. Y., executive secretary.

15-18—Association of Dairy Food and Drug Officials of the United States, Ansley Hotel, Atlanta, Ga. W. C. Geagley, secretary-treasurer.

15-20—Dairy Industries Exposition, Public Auditorium, Cleveland, Ohio.

18-20—International Association of Ice Cream Manufacturers, Hollenden Hotel, Cleveland, Ohio. Robert C. Hibben, executive secretary, 423 Telegraph Bldg., Harrisburg, Pa.

22-24—Annual meeting of the baking industry under the direction of American Bakers' Association, Hotel Sherman, Chicago, Ill.

24-26—Associated Grocery Manufacturers of America, annual meeting, Hotel Traymore, Atlantic City, N. J. Paul S. Willis, 205 East 42d St., New York, N. Y., president.

NOVEMBER

12-14—National Cooperative Milk Producers' Federation, Onondaga Hotel, Syracuse, N Y. Charles W. Holman, 1731 Eye St., N.W., Washington, D. C., secretary.

12-16—American Bottlers of Carbonated Beverages, annual meeting and exposition, 106th Armory, Buffalo, N. Y. John J. Riley, 726-29 Bond Bldg., Washington, D. C., secretary.

20-22—Southern Association of Ice Cream Manufacturers, annual meeting, Atlanta, Ga. John R. Kinnett, secretary.

Beef Purchases Tapered; To Buy More Butter

Summary of market conditions to be expected in the coming months as a result of the drought points to a sustained advance in wheat, feed crops, meat—particularly prime beef—and a stabilized butter market, according to information available in government sources. Meanwhile, the A.A.A. is tapering off its previously heavy purchases of cattle on the theory that the recent rains will bring adequate late pasturage in some sections. So far, relief cattle purchases total about 6,000,000 head, with indications that probably 1,500,000 more will be taken over by the government. Much fresh meat and some canned meat has been distributed for relief, but the bulk of the packed products are being held for future demand.

Sheep purchases in drought areas started shortly after the middle of September at a rate of about 60,000 head per week and were expected to exceed this until about 2,000,000 had been acquired.

New authorizations for the purchase of creamery butter were made Sept. 14, and continuation at the present rate of 2,000,000 lb. per week until about 50,000,000 lb. have been pared off the present surplus will stabilize the price at close to 30c. a pound, dairy interests estimate. While the dairy leaders have been pushing development of export markets for butter through an organization similar to the Dairy Marketing Corp., which stabilized prices of that product through heavy purchases last season, they have dropped this campaign because relief purchases are expected to leave no butter for shipment abroad.

The administration also has authorized the purchase of 2,805,000 lb. of domestic Swiss cheese, and reports have it that the government will buy from 750,000 to 1,000,000 cases of salmon.

Dairy Probe Progresses

Field work in connection with the Federal Trade Commission's investigation of trade practices in the milk industry is expected to be completed this month in Connecticut. A preliminary survey has been made of the Massachusetts markets. Philadelphia milkshed conditions are to be studied next, to be followed as soon as possible by surveys of other milk sheds.

Food Trades Fight Boost In Freight Rates

Food distributors and manufacturers have joined farm organizations and other industries in opposing the railroads' petition for increased freight rates, on which hearings commenced before the Interstate Commerce Commission Oct. 1.

National-American Wholesale Grocers' Association has directed a protest against any rate increases on all commodities handled by wholesale grocers and specifically canned goods, packing house products, grain products, rice, sugar, fruits and vegetables. The association informed the I.C.C. that even with no increase in hauling charges, grain products will cost consumers more because of the drought. An increase in rates on fruits and vegetables, it was asserted, will deprive the railroads of much short-haul traffic.

The railroads' petition proposes to increase carload rates on the following:

Grain, flour, meal and cereal foods, generally 3c. per 100 lb. except in Eastern territory; fresh vegetables and fruits, except citrus fruits, 10 per cent with a maximum of 3c. per 100 lb.; vegetable oils, 10 per cent with a maximum of 3c. per 100 lb.; dried and evaporated fruits, 10 per cent with a maximum of 5c. per 100 lb.; coffee, 10 per cent with a maximum of 4c. per 100 lb.; cattle, sheep and hogs, 10 per cent on rates over 25c. per 100 lb.; beet and cane sugar, 10 per cent with a maximum of 2c. per 100 lb.; molasses and syrup, 1c. per 100 lb.; canned and preserved foodstuffs, 10 per cent with a maximum of 5c. per 100 lb.

Charges Unfair Practices

A complaint charging unfair competition in the sale of baking powder has been issued by the Federal Trade Commission against Griffin Grocery Co., Muskogee, Okla. Disparagement of a competitor's product by representing the leavening properties of "Hi-Lo" baking powder as greater than they actually are and greater than that of competitive powders is the principal unfair practice charged.

"This representation," the commission's complaint states, "is based on results of a so-called 'water glass test' which purports to show the superiority of 'Hi-Lo' baking powder over competing powders due to the addition of a minute portion of dried white of egg over and above the ingredients usually found in baking powders."

Notice to Dairymen

Anyone connected with the dairy industry or having a legitimate interest in it may attend the Dairy Industries Exposition, to be held in Cleveland Oct. 15-20. Only the general public and those inspired merely by curiosity are barred.

C. O. MOSER

Form Fats and Oils Group

Motivated by the largest carry-over of fats and oils in the history of the country, producers and processors of these products have banded together under the Institute of American Fats and Oils to "protect their products against foreign competition and against domestic discrimination." The organization also will endeavor to increase the consumption of fats and oils by a program of consumer education, and it has set up a home economics department for this purpose. One of the main goals of the institute is favorable legislation for oleomargarine.

Heading up the new organization is C. O. Moser, New Orleans, for many years president of cotton cooperatives. One of the institute's directors, H. R. Davison, is connected with the Institute of American Meat Packers.

HORS D'OEUVRES

CEREAL CROPS are grown in ten days inside small metal cabinets by a chemical process discovered in Germany. Plans are to extend this to vegetables that the housewife may grow her supply of fresh foods in the pantry.

•

IT has been discovered that onions radiate ultra-violet rays. Wonder if onion-fed cows would give irradiated milk?

•

FIVE GALLONS of American-made ice cream recently was shipped to Glasgow, Scotland, where it was highly praised for its rare quality. Luckily, no one told the Scotchmen about the 100-per cent overrun.

•

VACUUM PACKING in the kitchen is made possible by a new mechanical exhauster which looks something like a bicycle pump. But to operate this means work, so commercial packers won't have to worry about competition from many American housewives.

•

THE SOUTHERN RICE INDUSTRY has set out to inform the public that rice is a very good food. Probably it is. Four hundred million Chinamen surely can't be wrong.

•

GENERAL MILLS is giving a 108-page hymn book with flour packages from 5 to 48 lb. Very generous, but what are consumers supposed to do with the hymn books?

•

FROM ENGLAND comes news of a penny-in-the-slot dispenser for slab ice cream. Why not add a chocolate-syrup slot and dispense two-cent chocolate sundaes?

Fish Canners Change Codes

Three fish-canning industries withdrew from the fishery code Sept. 25, and were placed under the code for the canning industry. The three are tuna-fish canning, Pacific Coast clam packing, and shrimp and oyster canning in the South Atlantic and Gulf States area. The petitioners for this code shift were California Fish Canners' Association and California Packing Corp.

Seizes Cream and Butter

Focusing the spotlight of investigation upon cream and butter, the Federal Food and Drug Administration has made many seizures recently. It was announced Sept. 24 that twenty consignments of cream en route to butter manufacturers were seized during August and that this campaign would be continued and extended. Thirteen consignments of filthy creamery butter were seized in St. Paul, St. Louis, Cincinnati, New Orleans, Chicago and New York City, and seventeen other consignments were found deficient in fats.

Far Too Little Milk Used

Final analysis of the facts obtained in the milk consumption survey by the consumers' counsel of A.A.A. shows that combined purchases of fresh and evaporated milk among the families covered were more than 27 per cent below "safe" health requirements. Fourteen per cent of the families reported that they bought no fresh milk at all, and the average for the entire group amounted to little more than half a pint per person daily. Purchases of evaporated milk amounted to a little more than 18 lb. a year for each person, which is somewhat above the average for the nation.

This investigation was carried on among 29,485 families in 59 cities in 46 States and was limited to families which had children in school and had incomes ranging from "average" to "low."

Chemists Present Papers On Food Technology

Many of the scientific papers presented at the annual meeting of American Chemical Society at Cleveland, Sept. 10-14, had important bearing upon problems of the food processor. The mysteries of the browning of orange juice were explained by M. A. Joslyn and G. L. Marsh, of the University of California.

According to their paper, browning involves a whole series of reactions, but the mechanism that sets these off is a primary product of oxidation. Browning is prevented by the use of anti-oxidants, such as salts of sulphurous acid, stannous salts and maleic acid. The addition of a small quantity of sulphite also is effective, as is the action of tin and tin salts introduced when the juice is canned.

A paper by A. K. Balls and W. S. Hale attributed the darkening of freshly cut apples to a reaction catalyzed by peroxidase. Peroxidase inhibitors, therefore, are important in delaying discoloration of cut fruit. These fall into two classes: substances affecting the enzyme directly, and substances accelerating its inactivation by hydrogen peroxide. The former class, including sulphydryl compounds, is the more important.

The effect of processing on vitamins was discussed in two papers. One, by Prof. Agnes Fay Morgan, pointed out that there was a surprisingly small loss of vitamin B in baking. The other, by Dr. C. R. Fellers, R. E. Young, P. D. Isham and J. A. Clague, explained that there is four times as much vitamin C in raw as in cooked asparagus. The paper also held that the freezing of raw asparagus was a very satisfactory way of preserving the vegetable, since it in no way injures the vitamin C content.

FTC Looks Into FDA

Formation of Food Distributors' Association, Inc., by five of the large grocery chains has produced repercussions in the trade. The Federal Trade Commission, acting upon complaints by wholesale grocers and by N.R.A., has instituted a preliminary inquiry into the organization of this powerful combine.

Headed up by F. H. Massmann, vice-president of National Tea Co., the association includes Kroger Grocery & Baking Co., Safeway Stores, Inc., First National Stores, American Stores Co. and National Tea Co. It has headquarters at 220 East 42d St., New York, N. Y. While ostensibly formed "for the purpose of conducting a general brokerage business in the food and grocery line and to render valued services to its clients in the nature of market posting and the furnishing of crop information, and so forth," it is considered significant that the 14,000 stores represented by the group give it a buying power almost equal to that of the Great Atlantic and Pacific Tea Co.

Isolated Labor Troubles Harass Food Trades

Labor troubles, though not serious in any food industry, continue to crop out as workers demand union recognition and better pay. There was a strike at General Baking Co.'s Tulsa plant, and workers in neighboring bakeries threatened to walk out. To terminate a strike in its Milwaukee plant, National Biscuit Co. acceded to the demands of labor on Sept. 7, agreeing to a wage increase of almost 10 per cent and continued recognition of the union. Controversies continued in other Milwaukee bakeries, with the organized workers turning down the terms of Oswald Jaeger Baking Co. and with the Jaeger, Continental and Carpenter bakeries seeking federal injunctions against picketing.

The long-drawn-out strike of the workers at three macaroni plants in St. Louis came to a close recently. The 300 strikers went back to work at their old wage rates and with the understanding that the question of recognition of their union and other disputed matters be submitted to the Labor Board. Involved in this strike were V. Viviano & Bros. Macaroni Manufacturing Co., Mound City Macaroni Manufacturing Co., and Italian Mercantile & Macaroni Manufacturing Co. The strike began July 16.

Trouble occurred at National Stockyards, National City, Ill., when union officials complained that officers of the yards were not enforcing the schedule of working hours established by the Labor Board on May 8. The St. Louis Regional Labor Board was called in to smooth out the difficulty. A labor disagreement which in June caused Eckart Packing Co., Fort Wayne, Ind., to close was settled recently and operations have been resumed.

Packers' Case Resumed

Taking of testimony in the Department of Agriculture's suit against twelve Southern meat packers resumed in Memphis, Tenn., Sept. 18, with defendants offering evidence. The government has rested its efforts to prove alleged price fixing.

PROMOTING THE PRODUCT

CAMPBELL SOUP CO. went on the air Oct. 5 with "Hollywood Hotel," a Columbia Broadcasting System program that will make movie fans soup-minded. It is scheduled for one hour on Friday nights.

SWIFT & CO. is sponsoring a one-hour coast-to-coast musical broadcast on Saturday nights, with Sigmund Romberg, over National Broadcasting Co. stations. The broadcast began Oct. 6.

STANDARD BRANDS, INC., put Mary Pickford on a Royal Gelatine broadcast Oct. 3. It is a Wednesday evening program over an N.B.C. hookup.

H. J. HEINZ CO. will launch another nation-wide newspaper advertising campaign soon, using the department-store style of copy so effective in presenting a variety of products.

MISSOURI EGG PRODUCERS' ASSOCIATION is using newspapers to tell consumers of the Mepa dated infertile eggs "laid the day before you buy them."

KROGER GROCERY & BAKING CO. is marking coffee with the date of roasting, not date of delivery, and is using newspapers to tell consumers about it.

GENERAL FOODS CORP. will capitalize on the following of Jack Benny and his cohorts with a radio series on Sunday evenings, starting Oct. 14, to promote Jell-O. Newspapers also will be used.

CREAM OF WHEAT CORP. is making a coast-to-coast radio appeal to the literary-leaning masses through the engaging gossip of Alexander Woollcott. A Sunday evening program over C.B.S., it began Oct. 7.

BEECH-NUT PACKING CO. is using 44 N.B.C. stations for a juvenile series on Monday, Wednesday and Friday evenings. The first broadcast was on Oct. 1.

RALSTON PURINA CO. has gone on the air with two programs. One, which started Oct. 1, is a "Tom Mix" broadcast over N.B.C. stations on Monday, Wednesday and Friday evenings. It promotes Ralston Cereal. The other began Oct. 3 and is a Wednesday night coast-to-coast musical broadcast over N.B.C. It advertises Ry-Krisp.

KRAFT-PHENIX CHEESE CORP. has been conducting a double-your-money-back campaign in the newspapers. It ends Oct. 15.

INTERNATIONAL MATÉ CO. is developing national distribution for Joyz Maté, a South American beverage, using a spread in the *New Yorker* to tell the country about it.

AMERICAN OYSTER CO. is promoting the sale of fresh oysters by marketing them through milk dealers, who visit every place where food is used.

BOOTH FISHERIES CORP. is sponsoring an appropriate dramatic series, "Fish Tales," over C.B.S. stations on Wednesday forenoons. The broadcast began Sept. 19.

Shrimp Inspection Begins; Service to Be Extended

Federal inspection in shrimp canning plants got under way Sept. 4, when the provisions of the new Section 10A of the Federal Food and Drugs Act went into operation. Number-one permit to employ the inspection service was obtained by Sea Coast Packing Co.

Inspection will not be limited to shrimp packing plants, for under proposed regulations sent to packers of canned fish on Sept. 8, Section 10A was applied to tuna, sardines, mackerel, bonita, yellowtail, shad, and food in which any of these fish is an ingredient. Since small packers are permitted to cooperate in the employment of the inspection service, it is expected to be widely accepted.

New Ice Cream Group

Independent ice cream manufacturers organized a national association at a meeting in New York Sept. 12. Although a name has not been definitely selected for the group, it probably will be called the National Association of Independent Ice Cream Manufacturers. A committee was named to draw up a constitution and appoint regional representatives, Louis A. Carliner, Bettar Ice Cream Co., Baltimore, heading it.

Meat Packers Boost Wages

Wages in the meat-packing industry have been stepped up to a point where they are equal to or greater than those maintained in any other important industry. This happened on Sept. 24, seven of the large meat-packing houses and many of the smaller ones announcing wage increases of 8 per cent. The large packers granting the rise include Swift & Co., Armour & Co., Cudahy Packing Co., Wilson & Co., George A. Hormel & Co., John Morrell & Co. and Rath Packing Co. This move will cost the "big four" packers alone more than $10,000,000 annually in wages. The new hourly rates of pay are 5c. in excess of those prevailing in 1929.

The industry's sweep to higher wages grew out of a determination to appease clamoring laborers and make it more difficult for the American Federation of Labor to break back into the industry. The increase also strengthens the company labor organizations.

Ten Field Men Appointed For Candy Industry

Recognizing the difficulty of administering the candy industry code among the 1,565 manufacturers scattered from coast to coast, National Confectioners' Association has appointed ten men for field work. Working in the various zones of the industry, these men will establish direct contact with the manufacturers and will operate under the direct jurisdiction of the administrative agency for the code authority.

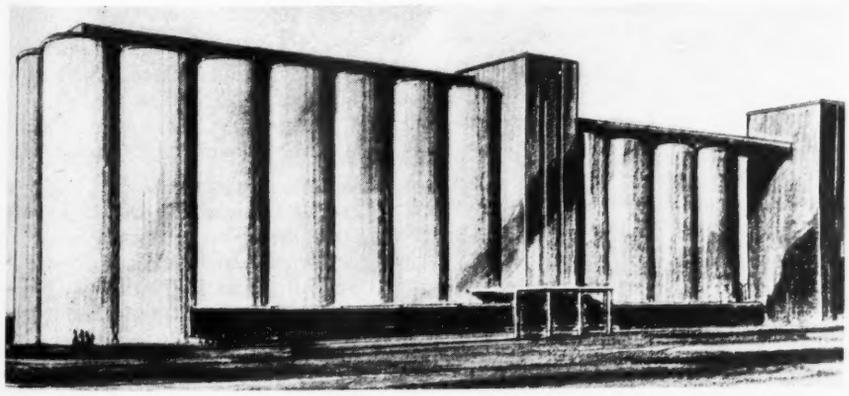
The following men have been appointed for this work:

Walter H. Belcher, Zone 1; W. C. Kimberly, Zone 2; F. E. King, Zone 3 and West Virginia; B. F. Cronkrite, Zones 4 and 7, exclusive of West Virginia; L. J. Maschka, Zones 8 and 9; L. C. Blunt, Zone 12; Robert W. Peery, Zone 10, exclusive of the El Paso district in Texas, and also Zones 5 and 6.

Field men for the Pacific Coast and the Northern and Southern divisions of Zone 13 have been appointed and their acceptance is expected at an early date.

A.A.A. Opposes Sales Tax

If the processors of basic foods seek alleviation of their processing tax burden through a general sales tax on foods, they will run into strong opposition in the Agricultural Adjustment Administration. Leading officials of the A.A.A. are against such a tax, and it is understood that Secretary Wallace, in his new book, "New Frontiers," which will be off the press this month, points out that the general sales tax on all foods would open the way for demands from producers of other than basic commodities.



WILL STORE MILLIONS OF BREAKFASTS

One million bushels of corn and wheat can be stored in the huge grain elevator to be constructed by Kellogg Co., Battle Creek, Mich., the architect's version of which is shown here. The new elevator will enable the company to dispense with terminal storage facilities. Of concrete and steel, the structure will stand 110 ft. high and consist of fourteen circular bins and six inner space bins.

Issues Beverage Standards

In its move to bring about standards of sugar, acid and carbon dioxide content in carbonated beverages, American Bottlers of Carbonated Beverages has analyzed 100 samples of lemon-flavored soft drinks. And with this data as a basis, it recently issued the following tentative recommendations for lemon-flavored drinks:

1. That LEMON SODA be made with from 10 to 12.5 per cent sugar by weight, with 1 to 1¼ fluid ounces of standard (50 per cent) citric acid solution per gallon of 30-deg. Baumé syrup, and with not less than 3 gas volumes of carbon dioxide.
2. That LEMON SOUR SODA be made with from 10 to 12 per cent sugar by weight, with 1¼ to 1¾ fluid ounces of standard citric acid solution per gallon of 30-deg. Baumé syrup, and with not less than 3 gas volumes of carbon dioxide.
3. That LEMON "DRY" SODA be made with 9 per cent sugar by weight, with 1¾ to 2 fluid ounces of standard citric acid per gallon of 30-deg. Baumé syrup, and with 4 gas volumes of carbon dioxide.

CONCENTRATES

Bakeries whose sales are not over $5,000 annually need not contribute to code funds, N.R.A. recently ruled. . . . N.R.A. is investigating a claim that bread is being imported from Canada more cheaply than it can be produced domestically.

R. S. Hollingshead has been appointed acting deputy administrator to succeed R. H. Fielder as head of the fisheries section of the food division of N.R.A. . . . Canners who operate trucks are subject to the provisions of the trucking industry code only where they operate such trucks for hire, according to a notice from the canning code authority.

Simplified practice recommendations covering containers for extracted honey became effective Oct. 1, substantially reducing the number of sizes. . . . From the standpoint of their effect on odor and taste when used in butter boxes, Southern hardwoods have been rated in order of preference by U. S. Forest Products Laboratory as follows: ash, soft maple, hackberry, sycamore, beech, yellow poplar, elm, black gum, basswood, cottonwood, red gum and magnolia.

A short course for ice cream manufacturers will be held at the University of Minnesota Nov. 5-10. . . . Average distribution costs for nine grocery manufacturers covered in a survey by Association of National Advertisers was found to be 27.11 per cent of net sales; the figure for confectionery and bottled beverages was 31.55 per cent.

The Dairee date, a native of Iraq and Persia, recently was found growing in California, developing into a better fruit than it does in its original home, and it holds good possibilities for regions with heavy soils and ground water near the surface. . . . Manufacturers of ice cream and frozen desserts in Massachusetts are to be held to rigid regulations through a system of licensing.

MEN . . . JOBS . . . AND COMPANIES

Industry

ARMOUR & Co.'s old beef slaughter house at Chicago was damaged to the extent of $25,000 by a fire recently while being remodeled.

EAST SIDE GROCERS' ASSOCIATION, Cleveland, has started operation of its own bakery to meet competition of bakers selling at cut prices.

FROSTED FOODS SALES CORP., New York, N. Y., announces a strong demand for quick-frozen products. It is experiencing an early sell-out in some of its seasonal lines.

H. J. HEINZ Co. reports more employees than at any time in its 65 years of existence. Its Princeton (Ind.) plant has reopened; it is constructing a two-story building in New Orleans; some of its plants are being enlarged and construction of two factories in foreign countries is being considered.

H. P. HOOD & SONS, INC., Boston, Mass., acquired Noble's Milk, Inc., for $125,000 at a bankruptcy sale. The Noble plant will continue to operate under its present personnel.

JOE LOWE CORP. suffered $81,000 damage when its large Kansas City egg drying plant was destroyed by fire recently. The fire "fried" 30 tons of eggs.

KRAFT-PHENIX CHEESE CORP. reports sales $9,000,000 ahead of last year, with gains divided equally between the cheese and salad divisions. The company opened a new $40,000 plant at Victoria, Texas, Sept. 21 and contemplates further expansion in the Southwest.

KROGER GROCERY & BAKING Co. will construct in Cincinnati a new meat-processing plant and power house at a cost of $550,000. Kroger recently moved equipment from its Chicago coffee-roasting plant to Cincinnati, where coffee roasting will be centered.

MOORES & Ross, Columbus, Ohio, has put into effect a plan whereby farmers who meet certain special regulations laid down by the company for production of milk are paid a special bonus.

NATIONAL FRUIT PRODUCTS Co., INC., Washington, D. C., has bought the Harrisonburg (Va.) plant of Shenandoah Valley Canning Corp.

NEW YORK BUTCHERS' DRESSED MEAT Co., Armour & Co. subsidiary, has purchased the slaughtering business of J. M. & P. Scanlon Co., New York.

PHILLIPS PACKING Co., INC., Cambridge, Md., now publishes monthly a tabloid newspaper house organ, *"P. D. Q."* (Phillips Delicious Quality). The publication goes to wholesalers and retailers.

PREMIER-PABST CORP., Milwaukee, Wis., obtained a district court injunction Sept. 6 restraining Elm City Brewing Co., New Haven, from using the trade name "Old Maestro" in the sale of beer.

SODUS FRUIT EXCHANGE, St. Joseph, Mich., opened early in September a fruit-packing plant costing about $50,000 and replacing the one destroyed by fire last winter.

SNIDER PACKING CORP., Rochester, N. Y., will pack government beef at three of its New York State plants and will install special equipment.

SPRECKELS SUGAR CORP., Yonkers, N. Y., will reopen its refinery in 1935 if it can obtain federal court authorization.

SWIFT & Co. has purchased ground for construction of a cheese factory at Glasgow, Ky.

TASTYEAST, INC., Trenton, N. J., announces plans for a reorganization under the recent amendment to the Bankruptcy Act.

PERSONNEL

G. L. MONTGOMERY

Former member of the editorial staff of FOOD INDUSTRIES and for many years a technical editor of McGraw-Hill Publishing Co. magazines, who resumed his position as managing editor of FOOD INDUSTRIES Sept. 15.

DR. CLARKE E. DAVIS

He has been appointed director of research and sales promotion of Virginia Dare Extract Co., Brooklyn, N. Y. Mr. Davis formerly was general manager of production for National Biscuit Co., New York.

FRANK ARMSTRONG, SR., has been reelected president and treasurer of National Fruit Products Co., which operates a chain of plants in Virginia, West Virginia and Maryland.

SAMUEL R. BLACK, president of Ambrosia Co., recently formed the A. G. Morse Co. division to manufacture confectionery.

ALBERT BECKER, founder of Modern Bakery, Nashville, Tenn., is now production manager of Superior Baking Co.

J. B. CARR, general manager of J. B. Carr Biscuit Co., Wilkes-Barre, Pa., has taken over a majority stock interest in Thomas & Clarke, Peoria, Ill., and has sent W. C. Evans, formerly assistant sales manager of J. B. Carr Biscuit Co., to Peoria as assistant general manager.

HAYNES F. COLLINS, former manager of Quality Bakery, Winston-Salem, N. C., now is with Joe Lowe Corp.

JOHN J. CONRON, JR., has been appointed manager of Armour & Co.'s branch at Fall River, Mass., where he succeeds V. E. Macomber, who retired.

FRANK J. COUGHLIN, Procter & Gamble Co. research chemist, succeeds the late M. B. Graff as chief chemist of the bakery service department.

WALTER J. CROFT, brewmaster of Croft Brewing Co., Boston, Mass., has been honored by the Lord Mayor of Dublin, Ireland, for outstanding contributions to the brewing profession.

LEWIS A. CUSHMAN, JR., recently was named president of Cushman's Sons, Inc., New York, to succeed J. T. MCCARTHY, who resigned as vice-president and director of Purity Bakeries Corp. and as president and director of Cushman's, Purity subsidiary. LEWIS A. CUSHMAN, SR., became chairman of the board and JOHN E. CUSHMAN, vice-president and general manager.

F. H. DELLWO, formerly in the research department of American Can Co. and in the shrimp section of National

RAYMOND K. STRITZINGER
Made assistant general manager and member of the board of Continental Baking Corp.

C. HENDERSON SUPPLEE
Head of Supplee-Wills-Jones Milk Co. and dairy industry pioneer passes.

Canners' Association, has been put in charge of a newly established research laboratory of Dorgan-McPhillips Packing Corp., Mobile, Ala.

W H. DIETZ has been elected president and general manager of Hathaway Baking Co., Cambridge, Mass.

GEORGE V. DAYTON was elected president of Buckwheat Millers' and Shippers' Association at the annual meeting in Elmira, N. Y., Sept. 22.

J. J. DRAPER has been made president of Jersey Ice Cream Products, Inc., Baltimore, succeeding M. Jacob Abrams, resigned.

GEORGE A. EDDINGTON on Sept. 8 was appointed manager of Archibald Candy Co., Chicago.

JAMES P. GRAY resigned from the research department of Walter Baker & Co. Sept. 1 to become assistant general manager of Hollander, Inc., Holland, Mich.

G. G. GEYER, JR., has been elected general manager of Gebhardt Co., San Antonio, Texas, to succeed G. G. Geyer, deceased.

JOHN LOIBL, formerly superintendent of three large flour mills at Evanston, Ill., has joined A. F. Edelblute in the operation of North Lewisburg (Ohio) Milling Co.

M. LEE MARSHALL, chairman of the board of Continental Baking Corp., New York, on Sept. 13 was given the added office of president, vacated by the recent death of M. L. Livingston. At the same time, SAMUEL F. MCDONALD was designated senior vice-president and RAYMOND K. STRITZINGER and GEORGE M. GOTTFRIED became members of the board of directors. Mr. Stritzinger will serve as assistant general manager.

HENRY K. NANZ recently was appointed manager of the Louisville plant of Armour & Co., succeeding S. R. Richardson, who was transferred.

EARLE L. RICH, former sales manager of Maillard Corp., Long Island City, N. Y., succeeds Thomas B. Fisher as president of the company. Mr. Fisher is now chairman of the board.

P. M. SIDOROFF now heads up the canned fish department of Amtorg Trading Corp., succeeding I. I. Krotoff, who left for Russia recently.

EARL WALKER, district manager in Chicago for Mars, Inc., has been transferred to the Pacific Coast.

C. F. WARD has been appointed manager of the Oak Park branch of National Biscuit Co. and D. Carlson has been made manager of the Gary (Ind.) office.

EARLE WEISBROD, formerly manager of Schrafft's bakery department in New York, now is associated with Bradbury, White Plains, N. Y., and president of the newly organized Scotland Bakeries, Inc., Orange, N. J.

DONALD WHITE, director of American Institute of Food Distribution, resigned Sept. 1 to become managing editor and director of service for Voluntary and Cooperative Groups Magazine.

DEATHS

JOHN W. GLYNN, 78, president of Springfield (Mass.) Breweries Co., at Springfield, Sept. 12.

BRITTON L. HOOPER, vice-president of Stedman Co., Athens (Ohio) meat packers.

FRED A. KLUECK, 48, owner of Klueck's Bakery, Buffalo, N. Y., Sept. 21.

WILLIAM C. LEISS, 65, manager of American Soya Products Corp., Evansville, Ind., at Union City, Tenn.

FRANK C. PEARCE, 71, formerly owner of Frank C. Pearce Co., Gloucester, Mass., at Gloucester, Aug. 19. He had been known as one of the ablest men in the fishing industry.

JOHN J. PEW, 92, chairman of the board of Gorton-Pew Fisheries Co., and a member of the Gloucester fishing industry for 75 years, at Gloucester, Sept. 24.

OSCAR B. SCHIER, 68, vice-president of Fairfield-Western Maryland Dairy, at Catonsville, Md., recently. He was an authority on the handling and inspection of milk.

BENJAMIN B. SHEFFIELD, 73, pioneer Northwestern miller, at Marine, Minn., Sept. 8. During his career, which began in 1880, he purchased the Polar Star mill, Faribault, Minn.; formed Sheffield-King Milling Co.; joined forces with Commander Mill Co.; became president of a group of milling companies, purchased a controlling interest in Larabee Flour Mills Co. in 1926 and organized Commander-Larabee Corporation.

FREDERICK C. SMITH, 64, co-founder and president of Smith Rice Mill Co., De Witt, Ark., at De Witt.

HORATIO STINNETT, SR., 72, prominent Southwestern miller, at Sherman, Texas, Aug. 24. He had been a miller for almost half a century.

LOUIS E. STORCK, 57, proprietor of Storck Baking Co., Parkersburg, W. Va., and former president of Quality Bakers of America, at Parkersburg, Sept. 4.

C. HENDERSON SUPPLEE, 74, president of Supplee-Wills-Jones Milk Co., Philadelphia, Pa., at Overbrook, Pa., Sept. 10. He spent more than 50 years in the dairy products field and was prominent in the development of the commercial ice cream business.

Associated Industries

ANCHOR CAP CORP. has acquired Salem Glass Works, Salem, N. J.

THE CAN LABELING and can casing machinery industry on Sept. 7 received approval of its code authority. The members are John L. Whitehurst, Burt Machine Co.; A. G. Moul, Hanover Machine Corp.; and A. H. Kyler, Westminster Machine Works.

THE CANNING and packing machinery industry code authority was recognized Sept. 17. The following are members: Ogden Sells, John C. Allbright, John Dubbs, Jr., R. A. Sindall, Frank C. Chapman, Lee W. Duer, W. E. Nicholoy, R. T. Randall and L. J. Meages.

CONTINENTAL CAN CO., INC., has called a special meeting Oct. 15 to vote on a 50 per cent stock dividend proposed by directors.

FEDERAL MOTOR TRUCK CO., Detroit, Mich., has appointed W. L. Schweninger Western sales manager, fleet division.

GLYCO PRODUCTS CO., INC., Brooklyn, N. Y., announces the appointment of Edward Rosendahl as vice-president and general manager.

PFAUDLER CO. opened a Boston office Sept. 10, with M. J. Goodwin in charge.

BUSINESS TRENDS

Prices Weaken

Influenced by disturbances in administration of N.R.A. codes, by unsatisfactory labor conditions, by pre-election activities of political leaders, and by price uncertainties, business has been increasingly temperamental during the past month. A hesitant attitude is being taken in spite of better steel operations, greater car loadings, generally higher commodity and bond prices, and relief from drought conditions.

Wholesale prices reached a new peak during the first week of September. More recently a decline in these prices has come, accompanied by a slight strengthening in business activity. Yet a questioning attitude toward governmental policies and a reluctance to assume aggressive tactics for fear of greater government intervention are keeping this activity cautious in nature.

The Business Week index of business activity, at 58.0 per cent of normal for the week ending Sept. 22, is a slight upturn from that of the past four weeks and is now practically at the Aug. 18 level.

Wholesale prices reported by U. S. Department of Labor as of Sept. 22 are slightly below the Sept. 8 high. For the five weeks they are greater by 1.84 per cent for all commodities, 6.82 per cent for farm products; and 3.51 per cent for foods.

Further weakening of prices is indicated by the weighted price index of the New York *Journal of Commerce*. For the five weeks ending Sept. 29 the index declined 2.15 per cent for all commodities to 77.3, and 8.13 per cent to 67.8 for foods. The index on grain prices remained practically unchanged at 88.3, which is a drop from the level of 91.7 of Sept. 8.

Fifteen Months of A.A.A. Fails on "Parity"

Efforts of A.A.A. to achieve parity prices for individual "basic" commodities during the last fifteen months has not reached the elusive goal defined in the act—namely, the ratio of prices received by farmers to the prices they have to pay that existed in the 1909-1914 period.

The line on the chart, shown on these pages, marked "All Commodities" is of general and political interest only. Behavior of individual commodities is the basis for payment of benefits.

Cost and price increases of goods which farmers buy, as a result of N.R.A. and P.R.A., probably account for the downward trend of the lines beginning in July, 1933. The effect of the drought is apparent in the rise of the lines since May, 1934.

When all lines reach 100 per cent of parity, the stated policy of the A.A.A. will have been achieved.

Meat Consumption Changes

Beef consumption in 1909 was 74 lb. per capita, the high point of all time. In 1933 it was 54 lb. per capita. Institute of American Meat Packers says 1934 will exceed 1933, but not equal 1909.

Pork consumption averaged 62 lb. per capita in five years, 1905-1909. In 1933 it was 74 lb.

Consumption of all meats was 143.9 lb. in 1933, about the same as in 1910 and 1900. The 1905-1909 average was 148.5 lb. per capita. The 1913 to 1922 average was 131.1 lb.

Drought Closes Canneries

Iowa canneries closed by drought are Grimes Canning Co. which lost its entire crop of corn and tomatoes at Grimes, Altoona and Pella and will not turn a wheel this year—first complete failure in its 35-year history. Atlantic (Iowa) Canning Co. lost its entire corn crop, but hopes to find a few pumpkins to pack.

U. S. Butter Stocks Low

Stocks of butter in cold storage in the United States are the lowest in years, on Aug. 1 amounting to 108,742,000 lb. This compares with 150,934,000 lb. in 1933 and the previous 5-year average of 134,597,000 lb.

In contrast, butter stocks in the United Kingdom are unusually heavy, standing on July 21, 1934, at 106,474,000 lb., and 73,889,000 in 1933, and 49,529,000 lb. in 1932. Foreign butters converging in England explain the rise. The drought had less effect on European production than in the United States.

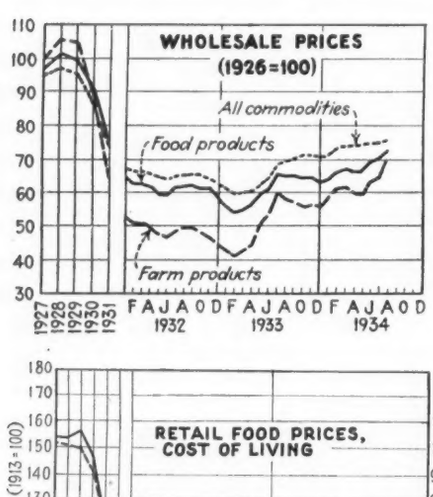
Sugar Distribution Decreases

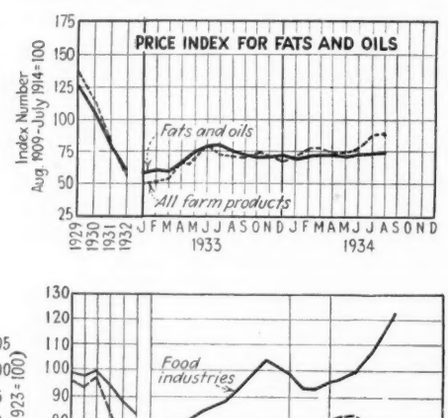
Sugar distribution in the United States during August approximated 559,258 long tons, raw sugar value, compared with 526,820 tons in August, 1933, an increase of about 6 per cent, according to Lamborn & Co. A decrease of 2.6 per cent occurred in the first eight months—3,928,801 long tons, raw sugar value, compared with 4,034,761 long tons in 1933.

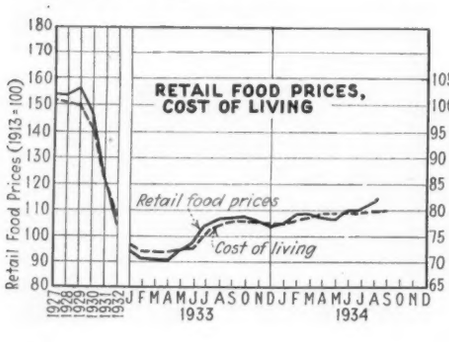
Beet sugar distribution was up 25.1 per cent at 1,040,619 tons, raw value, and cane sugar was down 9.8 per cent at 2,888,182 long tons during the first eight months.

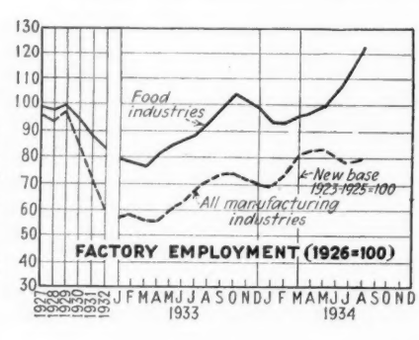
BASIS FOR THE CURVES

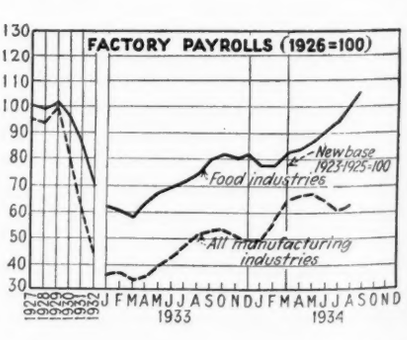
Retail food prices, factory employment, factory payrolls and wholesale prices are based on indexes of the Department of Labor. Cost of living index is that of the National Industrial Conference Board. The electric power consumption graph is being omitted, at least temporarily, the figures being no longer available.


WHOLESALE PRICES
(1926=100)
All commodities
Food products
Farm products
1927 1928 1929 1930 1931 F A J A O D F A J A O D F A J A O D
1932 1933 1934


PRICE INDEX FOR FATS AND OILS
Index Number Aug. 1909-July 1914=100
Fats and oils
All farm products
1929 1930 1931 1932 J F M A M J J A S O N D J F M A M J J A S O N D
1933 1934


RETAIL FOOD PRICES, COST OF LIVING
Retail Food Prices (1913=100)
Cost of Living (1923=100)
Retail food prices
Cost of living
1927 1928 1929 1930 1931 1932 J F M A M J J A S O N D J F M A M J J A S O N D
1933 1934


Food industries
New base 1923-1925=100
All manufacturing industries
FACTORY EMPLOYMENT (1926=100)
1927 1928 1929 1930 1931 1932 J F M A M J J A S O N D J F M A M J J A S O N D
1933 1934


FACTORY PAYROLLS (1926=100)
New base 1923-1925=100
Food industries
All manufacturing industries
1927 1928 1929 1930 1931 1932 J F M A M J J A S O N D J F M A M J J A S O N D
1933 1934

Fish Consumed Per Capita

Per capita consumption of fish in United States is the lowest in the world, according to the U. S. Bureau of Fisheries which presents the following data:

PER CAPITA FISH CONSUMPTION

United States	15 lb.
Canada	29 lb.
England and Wales	35 lb.
Norway	44 lb.
Sweden	52 lb.

Record Salmon Pack

The all-time record salmon pack for Alaska, reported by U. S. Bureau of Fisheries, based on incomplete statistics, shows a total of 7,234,227 cases in 1933, compared with the unrestricted pack of 1918 of 6,677,559 cans. Production of pink salmon was abnormally heavy at 3,766,129 cases. Behring Sea is to be closed to salmon fishing in 1935.

Coffee Consumption Off

World coffee consumption for July and August was 3,575,905 bags, a decrease of 6.5 per cent from the same period in 1933. United States consumption in the same period, indicated by deliveries, was 1,552,905 bags, a decrease of 16.1 per cent, according to statistics compiled by New York Coffee and Sugar Exchange.

Corn Grind Off 11 Per Cent

Domestic grind of eleven refiners of corn products for eight months, January to August, 1934, was 43,348,527 bu., a decline of 11 per cent below the 48,644,978-bu. grind reported for the same period in 1933, according to Corn Industries Research Foundation. August, 1934, grind was 6,541,773 bu., up 12 per cent over 1933.

Power Consumption

Chart showing the consumption of electric power by all industry and the food industry will no longer be shown on these pages. Reason: Nobody wants to continue to put up $3,000 a year necessary for the collection of these statistics.

Solar Constant Omitted

Chart showing forecast and march of monthly means of the solar constant of radiation is omitted temporarily. Reason: A new observatory is being opened in the Sinai Peninsula, data from which will be available shortly. Likewise, corrected data from the observatory in Montezuma, Chile, will soon be available.

The solar constant is the measure of energy radiated by the sun. Readers may receive the unrevised available data each month by writing to the editor.

CONSTRUCTION NEWS

	Pending (thousands)	Awarded September (thousands)	Total Awarded 1934 (thousands)
Bakery	$128	$380	$683
Beverages	587	401	7,635
Canning and Preserving	57	9	1,107
Confectionery	.....	.....	133
Grain Mill Products	335	100	3,770
Ice, Manufactured	35	.....	58
Meats and Meat Products	1,040	431	1,032
Milk Products	355	.....	1,420
Sugar	42	.....	105
Miscellaneous	455	350	1,034
Total	$3,034	$1,671	$16,977

INDICATORS

TWO LARGE CANNERS in central Indiana are suing growers to compel delivery of contracted produce.

FRUIT AND VEGETABLE CANNERS in British Columbia are complaining that selling prices are low and out of line with manufacturing costs.

TOTAL DROUGHT CATTLE PURCHASES were 5,900,000 head by Sept. 17. By Oct. 13, about 600,000 more are to be purchased, making the grand total of 6½ million head.

WHEAT ACREAGE CROP CURTAILMENT in 1935 will be only 10 per cent from the base instead of the 15-per cent figure used in 1934, according to present plans of A.A.A.

SNIDER PACKING CORPORATION'S move to pack 200,000 cases of peas at Harlingen, Texas, is the first large Northern packer's test of the Rio Grande valley as a point of production.

MUCH CANADIAN WHEAT is expected to find its way into the United States in 1934-35. About 3,500,000 bu. of Canadian durum had already arrived by Sept. 15. This wheat is largely used for macaroni products.

AN 8-PER-CENT INCREASE in wages to the majority of workers in the meat-packing industry was made possible by the higher prices obtainable for meats becomes effective Oct. 1.

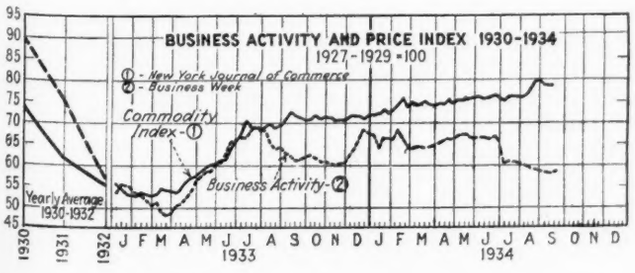
CRANBERRY CROP FORECAST, by C. O. Stevens, U. S. Department of Agriculture, at the Wareham (Mass.) meeting of the Cape Cod Cranberry Growers' Association, is for 335,000 bbl., a decrease of 26 per cent from 1934. Reason ascribed: Hard winter and lack of flowering.

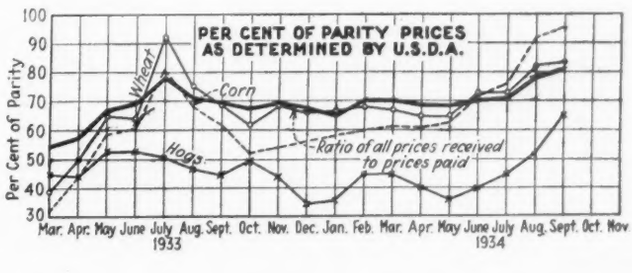
DAIRY MILK PRODUCTION per cow in New England was 14.82 lb. on Sept. 1, compared with 15.67 lb. on Aug. 1 and 14.42 lb. on Sept. 1, 1933. Dry cows on Sept. 1 were 18.94 per cent, compared to 18.62 per cent on Aug. 1 and 21.84 per cent last year.

SUPPLIES OF ALL MEATS will be considerably smaller in 1935 than in 1934. Prices may be expected to go higher after the turn of the year. The hog-corn ratio in June stood at 6.8, the lowest figure since the records originated in 1910. The corn-hog ratio is defined as the number of bushels of corn required to buy 100 lb. of hog.

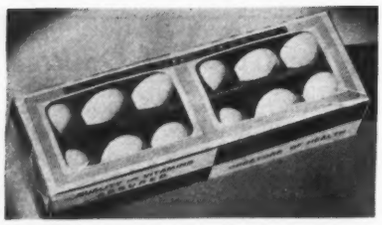
FROZEN FISH in storage was 39 per cent greater on Aug. 15 than it was a year ago, and 5 per cent greater than the 5-year average on that date. Holdings on Aug. 15 totaled 62,577,000 lb., compared with 44,882,000 lb. a year ago. The quantity going into storage during the month ending Aug. 15 was 17,348,000 lb., compared with 15,550,000 lb. in 1933.

BEET SUGAR PRODUCTION CONTROL in 1935 is being planned by A.A.A. Hearings are to be held in Denver in late autumn. It is planned to allocate sugar tonnage to the beet-sugar plants and to restrict the tributary acreage of beets to an amount sufficient only to produce the allotment. Benefits will be paid to farmers on the basis of the restricted acreage.


BUSINESS ACTIVITY AND PRICE INDEX 1930-1934
1927-1929 = 100
① - New York Journal of Commerce
② - Business Week
Commodity Index - ①
Business Activity - ②
Yearly Average 1930-1932
1930
1931
1932
J F M A M J J A S O N D J F M A M J J A S O N D
1933
1934

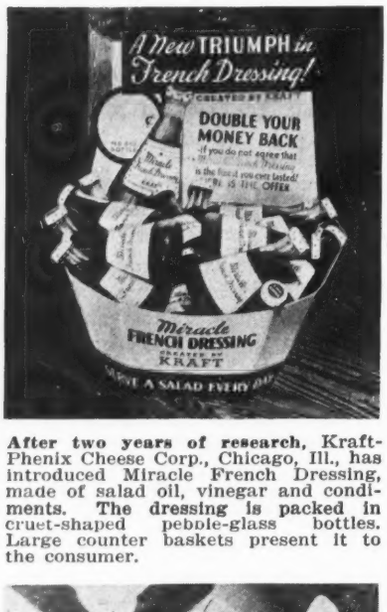

PER CENT OF PARITY PRICES AS DETERMINED BY U.S.D.A.
Per Cent of Parity
Wheat
Corn
Hogs
Ratio of all prices received to prices paid
Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov.
1933
1934

NEW METHODS ...PACKAGES ...PRODUCTS



Eggs wrapped in transparent cellulose constitute a new wrinkle in packaging introduced by Krenrich-Britten Co., New York, N. Y. In addition to displaying the contents effectively, this wrapping reduces shrinkage and prevents contamination of the eggs by foreign odors. Du Pont Cellophane Co., Inc., supplies the wrapping.

Something advanced in the line of spaghetti packages in the one used by Vimco Products Co., Carnegie, Pa. Of modern design, the color scheme on the box embodies, orange, yellow, blue and white to produce a lively effect. A sealed wrapper of transparent cellulose gives a finishing touch, at the same time protecting the contents of the box.



After two years of research, Kraft-Phenix Cheese Corp., Chicago, Ill., has introduced Miracle French Dressing, made of salad oil, vinegar and condiments. **The dressing is packed in** cruet-shaped pebble-glass bottles. Large counter baskets present it to the consumer.

Suggestive of the name, the container adopted by Jas. H. Forbes Tea & Coffee Co., St. Louis, Mo., for its Dutch Lunch mustard is appropriate. The "paddles" fastened to the container on display complete the "windmill" likeness.

Freezing Found Effective In Wine Clarification

Stabilization of wines by refrigeration, a method practiced for many years in Europe, recently has been introduced in California. And in a paper presented before the American Chemical Society at its meeting in September, M. A. Joslyn and G. L. Marsh, of the University of California, outlined recent experiments with this method. Results of the tests indicate that freezing is a highly efficient process of clarification. More cream of tartar is removed from wine frozen to 0 deg. F. and then thawed than from wine stored more than two months at a temperature of 32 deg. F. Since the quality of the wine was not appreciably impaired by freezing, the investigators recommend clarification by that process. A method involving freezing in ice cream freezers is now being developed for commercial use.

The process used abroad involves cooling the wine to its congealing point and holding it at this temperature for from one day to one month and then filtering it cold.

Chilling Clarifies Jelly

Following a practice used by vintners, the Agricultural Experiment Station at the University of Delaware has worked out a method of removing crystals of cream of tartar from grape jelly by chilling the juice. Under this method, the juice obtained by cooking and pressing the grapes is first cooled and then placed in a refrigerator, where it is chilled for at least 24 hours. While in the refrigerator, cream of tartar crystals will form in quantity and may be removed by straining the juice through a flannel cloth. From this point, the procedure follows regular methods.

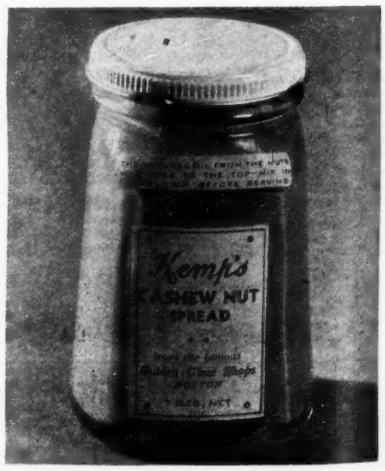
Two New Shortenings

Two new shortenings have appeared on the market recently. One is a "superstabilized" vegetable shortening, Covo "S.S.," developed especially for manufacturers of prepared mixes by Lever Bros. Co., Cambridge, Mass. Made from selected oils and passed through double-refining and hydrogenation processes, this shortening is said to stay fresh in the prepared mix for an unusually long time. It is also credited with a highly bland flavor, good "spreading" power, and a firm body that prevents the mix from becoming greasy.

The other new shortening is "Texturated Vegetole," introduced in the Southern market by Armour & Co. In the process of manufacture, this product is said to be cut into 3,500,000 parts per pound by a "texturator" and then reassembled. It is intended primarily for home baking.

Now It's Time for Quality

It pays food manufacturers to keep their fingers on the pulse of the times. At least it has in the case of Focke Packing Co., Dayton, Ohio. This packer felt that the public was in a position to buy higher-priced meat delicacies, what with some recessions in the depression. Consequently, it reintroduced a series of German style sausages — frankfurters, weiners, leona and bologna—which it had discontinued in favor of cheaper meats. All four products are made of fine quality pork, veal and beef, free from gristle and excess fat, and mixed with the best grade of spices, which naturally calls for a higher price. The acceptance of these delicacies has been even better than expected, close to 9,700 lb. being sold in Miami Valley the first week-end of their appearance.



Cashew nut spread is the latest development of E. F. Kemp, Inc., pioneer nut processors, of Somerville, Mass. The spread is made from ground, roasted East Indian cashews and is packed in 7-oz. jars. Spreads made from other nuts, such as almonds and Brazils, are the subject of study.

Quick-Freezes Juices

Orange, grapefruit and lemon juices are being frozen by Sunset Packing Corp., Los Angeles, Calif. Under this process, the fresh, tree-ripened fruit is precooled within a few hours after picking and immediately thereafter converted into juice. This juice is vacuum cold-packed in baked-enamel-lined cans and quick-frozen at —50 deg. F. For quick-freezing, the cans are immersed in alcohol, instead of brine, because the alcohol leaves no deposit on the container. After quick-freezing, the pack is stored at 0 deg. F. Distribution is made by steamer or refrigerator cars.

The illustration shows a cylinder of the frozen juice removed from the can and a tray of alcohol in which the cans are immersed.

Improves Lobster Pack

Burnham & Morrill Co., Portland, Me., recently introduced a new style lobster pack which has won such a response that the company is expanding its production facilities. Labeled "B & M Tasty-Fresh Lobster," this pack consists of whole claws and tail meat only, the fine particles being eliminated. While neatly fitted, the meat is packed more loosely than the usual canned lobster and in a considerably larger quantity of brine. The brine, the company reports, preserves the original flavor of the meat, retains its color and keeps it tender.

Vitamin D Emulsion

No special equipment is needed to introduce vitamin D into milk with the new method developed by National Oil Products Co., Inc., Harrison, N. J. This method is based on the use of vitamin D extracted from cod liver oil and emulsified in cream. A measured quantity of this concentrate is merely added to the milk in pasteurizing. This emulsion can be produced in two strengths to accommodate dairies of various daily outputs. A 6-oz. can of the stronger emulsion will fortify 3,000 qt. of milk to the standard potency of 400 U.S.P. units of vitamin D, while a can of the weaker emulsion will fortify 1,200 qt. to the same potency.

New Process for Figs

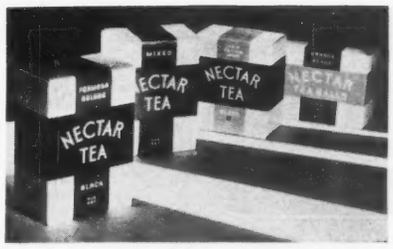
Research work by Texas Agricultural Experiment Station, College Station, has evolved an improved light-syrup method for canning Magnolia figs. Using sound, whole fruit slightly beyond the hard-ripe stage, the figs are dipped for 15 to 30 seconds, depending upon the ripeness, in a boiling 2 per cent sodium bicarbonate solution. Then the fruit is blanched in boiling water for three minutes, drained and placed in No. 1 tall tin cans. Next, it is covered with a 50 deg. Brix (27.3 deg. Bé.) syrup containing 0.35 per cent of citric acid (based on the weight of the sugar). The cans are exhausted until the contents reach 106 deg. F. and then are sealed and cooked at 212 deg. for 60 minutes. The cans are finally cooled in running water for ten minutes.

Vita-Sealed Potato Chips

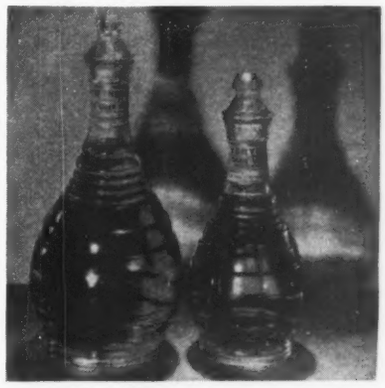
Mineralized potato chips have been put on the market in Portland, Ore., by Anderson Food Products Co. The outer skin has been left on this chip, and it is said to be rich in proteins, vitamins and mineral content. The company found that the cortical layer, next to the skin, contains a higher percentage of mineral matter, soluble carbohydrates and soluble nitrogenous matter than the tuber as a whole. The chip is particularly rich in potash and phosphorus, containing 60.37 per cent of the former and 17.33 per cent of the latter. Trademarked "Vita-Seald," these chips are prepared by cooking in pure vegetable oil.

12 Per Cent of Milk Solids Practical in Bread

"School-lunch bread" containing 12 per cent of fatless milk solids has been proved a practical product through experiments by American Dry Milk Institute, Inc., and the Bureau of Home Economics. There is no one definite formula for this bread, and any baker may produce it by adding 12 per cent milk solids (based on the weight of the flour) to his formula. However, from the production standpoint this bread falls into the classification of a specialty product, since it requires particular care and because the additional quantity of milk solids necessitates that it be sold at a slightly higher price. Bakers undertaking to produce school-lunch bread are advised by American Dry Milk Institute to use only highest quality milk powder.



Simplicity is the keynote of the new A.&P. Nectar Tea pack. Printed on a buff background are a wide horizontal band in either red, blue, green or black and a contrasting vertical band. By opening along scored lines, two small flaps are disclosed through which the tea may be poured and which may be reclosed. The package is by Robert Gair Co., Inc.

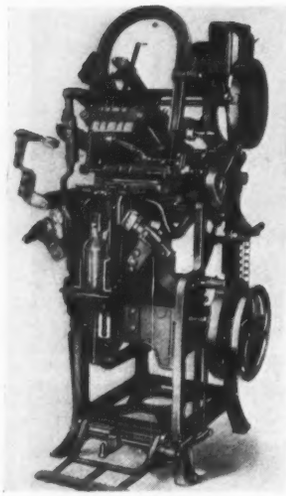


Decanters have become quite popular as vinegar containers. These recently were designed for New England Vinegar Co., Somerville, Mass., by Hazel-Atlas Glass Co.

An Early American hobnail tumbler distinguishes Williamson Candy Co.'s Princess Pat peanut butter from brands packed in smooth containers. And, of course, the glass has reuse value. However, the rough surface hinders smooth vitamin-D labeling.

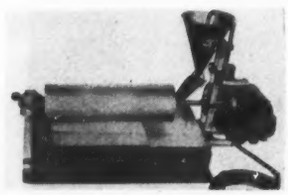
To get their share of the heavy business in Yuletide beverages, some of the wineries are going in for colorful containers. Paperboard baskets and six-bottle, carry-home cartons both will be used. These are by Hinde & Dauch Paper Co.

NEW • EQUIPMENT • FOR



Seal Strip Labeler For Taxed Beverages

To apply federal or state tax stamp strips to wine and other bottles a seal strip labeling machine is now made by Edward Ermold Co., Hudson, Gansevoort and 13th Sts., New York, N. Y. The machine, which handles half-pint, pint, quart and miniature sizes, "squeezes" the stamp strip on long neck or flask type bottles, applying the strip from front to back or over the shoulders. From 36 to 40 labels per minute can be placed in this way, equalling the work of six operatives labeling by hand. A set of double-ball-bearing roller casters with a cast steel bracket and steel frame may be had to make the labeler portable.



Checks Coffee Grind

To detect deviations from previously set standard "grind" sizes and to check the accuracy of coffee-grinding machinery, the Rotary Analyzer is being offered by Associated Coffee Industries of America, 11 Water St., New York, N. Y. The analyzer is essentially a hollow aluminum cylinder perforated with "4½" holes at close regular intervals, rotated almost horizontally by an electric motor. Ground coffee is fed slowly to the cylinder from a hopper, and is sifted into one of three metal baskets below, placed so that the fine particles fall into the first, the medium into the second, and the coarse into the third. By using a known quantity of coffee, the siftings in the three baskets may be weighed to find out whether the particular grind is close enough to standard specification.

Flexible Container

Shipping safety, low first cost, size flexibility and resilience are among the advantages listed by Union Bag & Paper Corp., Woolworth Bldg., New York, N. Y., for its new coffee shipping container of bag type. Made of two plies of kraft paper, the strength and flexibility of the material withstands puncture and bursting tendency. The container is manufactured in two sizes to hold 12 and 24 1-lb. bags. The smaller measures 11¼x19x5½ in. and weighs 4½ oz. per dozen. The larger bag measures 14¼x21½x8¼ in. and weighs 6½ oz. per dozen.

Bag Stapler

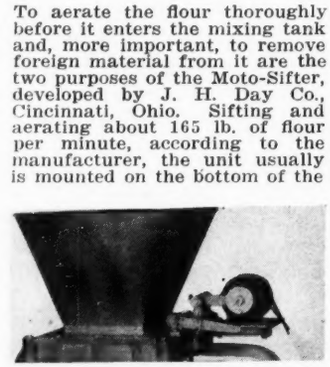
Designed for closing bags containing small or bulky materials, a pedestal stapler which forms and inserts the staples is being offered by Bates Manufacturing Co., Orange, N. J. Taking from one to three stapler heads, the device can be adjusted to allow different spaces between the staples. It is said to be able to insert the staple less than ½ in. from the contents. Available in any height required, the pedestal top has provision for extension to right or left. Model B, which contains enough rustproof brass wire for 5,000 staples, is the company's standard refill.

Streamline Milk Tank for Trailer

For hauling milk in cities, as from tank car to plant, Pfaudler Co., Rochester, N. Y., has developed an oversize truck tank of streamlined design. The weight of the assembly, including 3,000 gal. of milk, is 53,270 lb., allowable in cities though not on the open road. The overall length of the tank, built to fit a drop-frame semi-trailer, is 26 ft. 3 in., and the width is 96 in. The inner tank, made of stainless steel, is insulated and covered with welded aluminum sheathing. The beavertail back serves as a housing around the outlet flush valve, and covers an electric motor which drives a propeller agitator located in the tank end. This agitator is provided for mixing the milk prior to unloading, to assure an even distribution of butter fat.

Aerates and Sifts Flour Thoroughly

To aerate the flour thoroughly before it enters the mixing tank and, more important, to remove foreign material from it are the two purposes of the Moto-Sifter, developed by J. H. Day Co., Cincinnati, Ohio. Sifting and aerating about 165 lb. of flour per minute, according to the manufacturer, the unit usually is mounted on the bottom of the



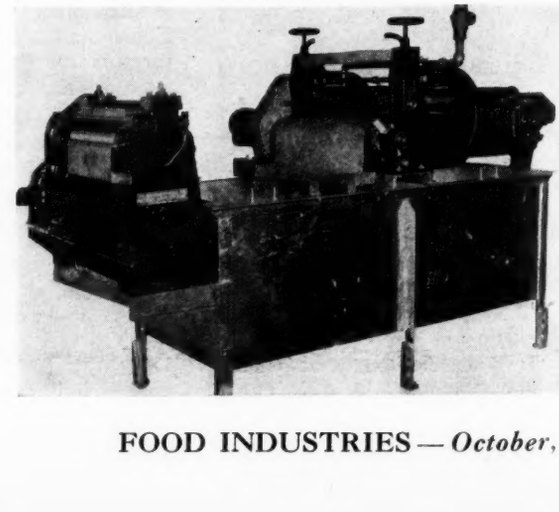
scale hopper, underneath the hopper slide. However, it may be mounted on a steel frame equipped with casters for portability, or it may be mounted on top of the mixer's canopy cover. It measures 22½x20x5½ in. Screen cloth for white flour usually is 14-mesh; for clear rye and other flours, 12-mesh.

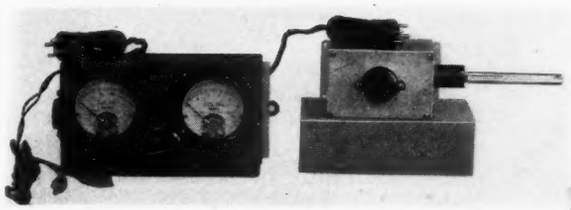
Operation Recorder

Plant operations over an eight-hour period may be recorded and checked with the electrical operation recorder developed by the Bristol Co., Waterbury, Conn. Instead of making one circular record, the instrument inscribes a spiral curve starting at the outer edge of the chart and gradually moving toward the center. This spiral record is made possible by a telechron cam which resets the record-making movement. The cam makes one revolution in eight hours, while the chart makes a revolution per hour; thus, a spiral curve covering eight rotations of the chart, with about ¼-in. spacing, is drawn. The movement of a small electro-magnet, which is energized when an external circuit is closed, actuates the pen arm and moves the inking pen about $\frac{1}{16}$ in.

Small Plant Unit Cleans Casings

Small and medium-size meat-packing plants in which sausage casings are cleaned are offered a complete "Fresh Process" unit by Allbright-Nell Co., 5323 South Western Blvd., Chicago, Ill. Not only will the unit eliminate obnoxious odors and reduce labor, says the manufacturer, but it will produce stronger, whiter and longer casings per hog than have been possible by older methods. The three machines used in the process are mounted on one tank—the mucous membrane crusher, the stripper and the finishing machine—which do their work after the casings have been "run" and their contents "stripped" by hand. The unit requires 4x8 ft. of floor space. It is equipped with motors to drive the three machines.





Electrical Vacuum Gage

For plants using vacuum packing methods, or vacuum processes, where a close control of vacuum must be maintained, Continental Electric Co., St. Charles, Ill., is offering the Model No. 6 "Tru-Vac" gage. This device operates electrically, indicating instantaneously any changes in vacuum. It also indicates the presence of water or other vapors which affect the resistance of the electrical circuit. As the dials are calibrated in microns, extremely small readings, in fractions of a micron, can be made. This gage is adapted for installation with any type of vacuum pump or system.

Controls Humidity, Temperature

Besides controlling temperature from 34 deg. F. upward by forced-draft cooling, the Humidi-Cooler, manufactured by Humidi-Cooler Corp., West Haven, Conn., controls relative humidity at from 75 to 90 per cent within a total variation of 5 per cent over any given period of time. Such control, the manufacturer states, is possible by means of a variety of adjustments between the fan and cooling coils. Made in five sizes, the three smaller sizes of the wall unit are suited to any refrigerant except ammonia, the two larger sizes including that, too. All the units have an aluminum casing, copper coils and brass fittings, and are equipped with deflectors. They range in size from 15x16x17 in. up to 27x27x26 in.

Wall Patching

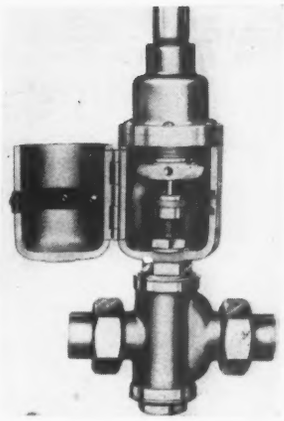
With a patching material called Wallseal, developed by Stonhard Co., 401 North Broad St., Philadelphia, Pa., any plant man can repair broken or chipped wall surfaces either inside or outside. The preparation in powder form is mixed with water to make a thick paste which can be applied with trowel or putty knife. An expanding chemical contained in the material compensates evaporation of the water, so that the patch adheres permanently to any surface, the manufacturer states. Other uses of the material include caulking, filling cracks and joints, and setting and resetting fixtures.

Mortarproofing

Sounder mortar joints are said to result from the use in the cement mixture, of Omicron Mortarproofing, a product of Master Builders Co., Cleveland, Ohio. According to the manufacturer, mortarproofing provides the essential features for mortar joints: (1) greatly reduced shrinkage; (2) improved adhesion; (3) greatly reduced absorption of water; (4) reduction of solubles which, dissolving, start disintegration and originate efflorescence; (5) increased plasticity; and (6) maximum strength. The product, usually not colored, is available also in ten standard colors.

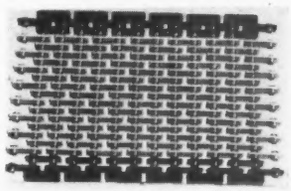
Non-Frosting Valve Stem

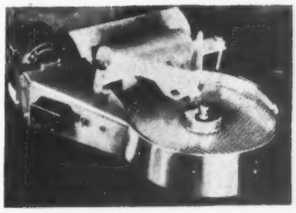
To prevent frost from forming on the valve stem where it enters the stuffing box, Fulton Sylphon Co., Knoxville, Tenn., has provided a metal housing for the valve stem and packing nut in its Sylphon temperature regulator for refrigeration systems. By filling this inclosure with asbestos saturated with ammonia compressor oil, it is said that sluggish functioning or actual freezing of the valve stem is prevented. Under test, the manufacturer states, the valve stem has functioned freely at temperatures as low as —70 deg. F.



Conveyor Chain

For canning, bottling and other operations where a smooth-running, smooth-surfaced conveyor chain is desirable, Diamond Chain & Manufacturing Co., Indianapolis, Ind., has developed a new chain in which the link plates are rectangular to give maximum continuity of surface. This chain also has maximum openings for controlled or natural ventilation. It is provided with sprockets having relatively large numbers of teeth on ½-in. pitch insuring smooth chain action. Most old conveyors can be remodeled for this new chain by installation of new sprockets.





Coating Machine

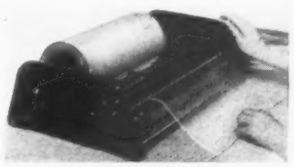
Production of hand-dipped-quality hard and soft centers is said to be possible with the "Sanidip" enrober, developed by Sanidip Manufacturing Corp., 1330 Bay St., Springfield, Mass. A thin sheet-metal pan placed directly on the slab supplies the coating to an aluminum drum, from which an aluminum scraper pan delivers it in ribbon form over a revolving disk, which carries the centers. The disk is set in a drag pan whence the excess coating flows back to the supply pan. Heat is applied in the drum and under the drag pan. The operator feeds the machine on one side and removes the centers with a fork on the opposite side. The enrober requires about 2 sq.ft. of floor space and weighs about 20 lb.

Temperature Control For Cooling Coils

Rigid attachment of the temperature-sensitive bulb to the valve, and omission of the customary flexible connecting tubing, make Type KR-15, developed by Sarco Co., Inc., 183 Madison Ave., New York, N. Y., a compact and less expensive temperature control for brine cooling coils used in refrigeration and cold storage. As the valve is "packless," no stuffing box being used, frosting in service cannot cause the valve to stick. The temperature at which the valve will hold the refrigerated space can be changed by means of a key furnished with the unit.

Hand Sheeter

Designed for hand packaging, the new sheeter developed by Wrapade Machine Co., 215 Central Ave., Newark, N. J., is said to save time and labor, and to eliminate waste. Fitting into the packaging line, the sheeter cuts the sheet to desired size and applies glue. Thus it prevents excessive overlap and permits a saving through buying transparent cellulose in rolls rather than in sheets. The three standard machines handle rolls up to 10, 15 and 20 in. wide; sheeters to handle rolls more than 20 in. wide are made to order. The model taking a 10-in. roll measures 15x14x6 in.; the two larger models vary from these dimensions only in width, measuring 20 and 25 in.



The Manufacturers • • Offer • •

Branded Milk—A brochure of American Seal-Kap Corp., 1105 44th Drive, Long Island City, N. Y., discussing the merchandising value of the Seal-Kap in establishing brand identity for milk.

Fiftieth Anniversary—Booklet in gold and black, generously illustrated, giving the fifty-year history of the Harnischfeger Corp., Milwaukee, Wis., and describing the plant and products of the company.

Flavors—Essences and oils. Fritzsche Bros., Inc., 78 Beekman St., New York, N. Y. Wholesale price list for September, 1934.

Cream Centers—For candies. Three booklets by The Nulomoline Co., 109 Wall St., New York, N. Y., dealing with cast creams, hand rolled creams, and the use of Convertit in creams.

Bronze Valves—A new line of heavy bronze globe and angle valves announced by Kennedy Valve Manufacturing Co., Elmira, N. Y. Illustrated folder.

Washing Fruit—Sodium silicates have proved useful in removing traces of lead or arsenic from sprayed fruit before marketing. Philadelphia Quartz Co., Philadelphia, Pa., describes this application in a current leaflet.

Water Pumps — Water-lubricated water-supply and deep-well pumps for agricultural and plant service. Pomona Pump Co., Pomona, Calif. Bulletin 16A, illustrated.

Packing—A packing service by engineers experienced in hydraulic packing problems, offered by Chicago Belting Co., Chicago, Ill., is described in a new leaflet.

Radio Tractor Control—Operation of the first radio-controlled farm tractor is described by International Harvester Co., Chicago, Ill., in an illustrated booklet.

Conduit—With a ball-bearing-like inside surface. Steel & Tubes, Inc., Cleveland, Ohio. Illustrated folder.

Flies! Gnats!! Ants!!!

(Concluded from page 461)

dissimilar food habits and character. The principal food of termites is the soft or cellulose portion of wood, and except the brown or black migrating forms, which appear in large numbers each spring, they are seldom discovered until the building collapses or they are exposed by incidental repairs. There are two general types: those which live entirely in the dry upper parts of the structure and those which may work in the upper structure but always have some form of inclosed runway connecting with the earth, where a definite moisture exists.

The usual control procedure for termite infestations is to tear out all of the wood structure affected by them, following each of their tunnels to the end, then to replace with materials treated with creosote or zinc chloride solution. Masonry and soil should be thoroughly soaked with creosote at the same time. While the forms that emerge in the spring are always a positive assurance of an infestation, they do not in any way indicate the size of the colony remaining or the direction their tunnels may run. In wood floors laid over concrete, good but somewhat uncertain control has been accomplished by impregnating the underflooring with creosote. This method, of course, is of value only in proportion to its thoroughness. Frequent inspection of all foundations for their covered tunnels will often verify the existence of an infestation in time to stop it before too serious damage has been done.

Crickets

Only a small percentage of the many cricket varieties customarily infest a food plant. The type most generally found (common house or field cricket) is about one inch long, usually from a dirty yellow to black in color and quite active. Their incessant chirruping and their ability to hop are common knowledge. In food plants they occasionally will appear in large numbers and are always obnoxious by their presence. They also will attack all fresh plant materials and occasionally clothing, but are generally looked upon as little more than scavengers and nuisances where foodstuffs are handled.

Poisoned baits (formula No. 4)[1] usually are effective in controlling crickets. These baits may be placed in dishes or scattered around wherever the crickets appear. Other food should be kept covered and all refuse kept cleaned up. Temporary relief or even a permanent riddance will often obtain from the liberal use of roach spray (formula No. 1)[1]. The usual habitat of these pests is outdoors. They enter the buildings during unfavorable weather. Closer screening of basement windows, doors and other openings will prevent much of this trouble.

Ants make theirs a mass attack. The workers are those that go and come as if in a military column formation.

$6,000 Worth of Good Milk Spoiled

(Concluded from page 440)

metallic ions. Dissolving of metals by milk—that is, corrosion of milk-handling equipment by the product—is therefore undesirable because of its direct and also its secondary effect.

Corrosion is essentially an electrochemical process. When, for one or more or several reasons, a voltage or difference in potential exists between two metal areas in contact with a solution which is conductor of electricity, one surface may be dissolved, entering the solution. The passing of current or the flow of electrons through a solution, with its attendant reaction, is called electrolysis.

In addition to galvanic current (an internal influence resulting from dissimilar metals) and stray current (an external influence), voltages leading to electrolysis may come from the following sources: (1) external influences—friction; (2) internal influences—different solution concentrations caused by stirring, aeration or unequal diffusion resulting from contour, loose scale, etc.; other effects such as differences in temperature and pressure. Galvanic currents may arise not only from the presence of different pure metals and alloys but also surfaces of alloys which are non-homogeneous in composition or structure, or from surfaces differing because of polish, strain, oxide film protection and the like.

REFERENCES

[1]Guthrie, E. S., C. L. Roadhouse, and G. A. Richardson: "Corrosion of Metals by Milk and Its Relation to Oxidized Flavors of Milk." *Hilgardia* (California Agricultural Experiment Station), vol. 5, p. 425-453.

[2]Hunziker, O. F.; W. A. Cordes, and B. H. Nissen: "Metals in Dairy Equipment." *J. Dairy Sci.* 12:140-181.

[3]McKay, R. J.; O. B. J. Fraser, H. E. Searle: "Practical Application of Corrosion Tests." Am. Inst. of Min. and Met. Eng., Tech. Pub. 192:1-47.

[4]Rogers, L. A. Report of Chief of Bureau Dairy Industry, U.S.D.A. 1928.

[5]Probably the only incontrovertible evidence would be simultaneous records from two oscillographs showing similar characteristics, one of them connected between suspicious points and the other from rail to ground or along the rail gradient outside the plant.

Patent Digest

Readers of FOOD INDUSTRIES who have expressed an interest in the Patent Digest section will have their wishes gratified beginning with the November issue. This digest was discontinued more than a year ago because apparent interest in it did not warrant the work necessary to its preparation.

It is being reinstated because of persistent requests from a group of readers who depended upon it for information about new patents and because of the wide response to our request in the August issue for an expression of interest.

An attempt will be made in this digest to give each patent announcement an interpretive title as well as to include name and address of patentee, co-patentee and assignee. Special attention is given to food process and product patents. Equipment patents are included when the subject of the patent is closely tied up with an advance in the technology of a process or product. Equipment-refinement patents are not likely to be included.